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SECOND LANGUAGE LEARNING STRATEGIES IN FORMAL INSTRUCTIONAL CONTEXTS

by

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with the assistance of

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Second Language Learning Strategies in Formal Instructional Contexts

ABSTRACT

From an analysis of 38 learning strategies used by university students in studying a second language in the language laboratory, the authors develop a model of a shift in the use of such strategies over three levels of formal second-language instruction.

It appears that most of the variation in the prediction of second-language achievement which cannot be accounted for by standard predictors, such as cognitive, verbal and motivational factors, may be explained in terms of use of six groups of learning strategies. A shift from attention to details of the learning task in beginning courses to a greater use of the linguistic context and of a more global approach to language learning in advanced courses was observed.

The findings also substantiate claims advanced by the cognitive-code theory of language learning that both cognitive structuring and processing and motor skill development are involved in the learning process.

1. CONCEPTUAL AND EMPIRICAL BACKGROUND TO THE INVESTIGATION OF LEARNING STRATEGIES

1.1 A Brief History Of Research In Learning Strategies

Psychologists have investigated cognitive learning processes since the 1950s in an attempt to conceptualize the various dimensions of man's cognitive apparatus and to test empirically hypotheses concerning its functioning. The beliefs of linguistic behaviorism which were popular among educational psychologists and teachers in the fifties and early sixties — according to which man was conceived as being essentially reactive in nature to stimuli within himself and his environment — were gradually replaced by the view that the learner actively takes certain steps to solve linguistic problems in learning a language: the shaping of responses as a teaching/learning process was to give way to the positing, testing and acceptance or rejection of hypotheses about language structure. Dulay and Burt's (1974, 1977) view is shared by theorists and practitioners alike, namely that second language learning resembles a creative construction process in which the learner builds up rules and structures for himself by developing a grammar of his own.

Clearly, there must be systematicities in the way in which the learner functions (of which he may or may not be aware) in his problem-solving approach, and learning strategies as a part of an individual's overall cognitive apparatus have received full attention by researchers since the early seventies. Two important articles by Rubin (1975) and Stern (1975) popularized the concept of the so-called "successful" or "good" learner in second-language learning and advanced hypotheses about his typical learning behavior. With the publication of a methodologically significant article by Hosenfeld (1976), in which a call is made for asking the learner to describe what he does when he learns (because, after all, he is in the best position to give an account of his cognitive functioning), the profession

embarked on a considerable number of investigations dealing with cognitive style, cognitive preferences, learning strategies, and the characteristics of the "good" language learner. More than 25 articles, books, and dissertations on this subject appeared between 1977 and 1979; subsequently, the number of publications dwindled drastically; educational researchers apparently turned to other subjects of educational research although a great number of relevant questions have not, by any means, been addressed and suitably answered; furthermore, the incidence of conflicting research results would certainly merit more extensive examination.

1.2 Terminology

A short discussion of terminology will facilitate an examination of the relevant literature. Terms which in the past were mutually interchangeable have become more specifically differentiated in the past twenty years (Kogan, 1971). When personality is viewed in its tripartite division of cognitive, affective and psychomotor domains, stable individual preferences in the mode of perceptual organization and conceptual categorization of the external environment may be called *cognitive style* (Kagan, Moss and Siegel, 1963). For example, the willingness (and even desire) to seek out the new, particularly in view of the chance to experience discouragement or failure, represents such a stable preference in the human personality; compare this tendency with a conservative, apprehensive or complacent view of the world. In order for it to be called "style" it must be pervasive in nature and must be observable in various aspects of life: for example, adventurousness in dealing with other people, in one's work or in leisure time activities.

A part of the general behavior pattern is learning behavior, the way in which new information is accepted, processed and retrieved,or in which new skills are acquired. Adventurousness may be exhibited as a *learning style* by going out of one's way to seek out native speakers of the target language and to acquire form and content in this manner.

Within the concept of learning style, two types of categories may be distinguished, *cognitive learning strategies* (the specific, smaller units of cognitive functioning, e.g., generalization of

knowledge of regularities acquired inductively or deductively to new sets of data) and *psychomotor learning strategies* (or techniques), which are items of psychomotor activity that may or may not accompany cognitive learning strategies (e.g., writing down key words in order to be able to remember significant information).

While there is a relatively large body of research on cognitive learning strategies, psychomotor strategies have not been given the same amount of attention in the literature; therefore their discussion will be deferred to a later section (see 2.2.4 and 5.6.2) in this study when their occurrence in the context of the present investigation is examined.

1.3 Methodological Considerations And Limitations In Research In Learning Strategies

In the following, the conceptual and empirical research in the areas of learning style, cognitive style and cognitive learning strategies will be reviewed briefly, especially in their relationship to success in second language learning.

One encounters a considerable number of methodological problems in this area, and many cannot really be resolved satisfactorily; yet attention is drawn to them to alert the reader to the tenuous character of empirical findings when he sets out to interpret them. For example, an intuitively meaningful concept such as "student need for high (low) structure in the learning environment" (Hunt, 1971) is empirically very difficult to validate because one cannot measure the overall concept directly; only its components or realizations are accessible, e.g., a student having a short attention span, being aggressive, asking for directions often, etc.

What should the conclusion be if empirical testing does not support the hypothesis that "need for structure" in the learning environment is differentially related to success in certain tasks in a consistent and systematic manner as measured by length of sustained effort at task, number of fights or number of requests for directions? How can "no significant differences" be

explained in such research? Reasons for such results include the following:

a. there is, in fact, no systematic relationship between predictor and predicted variable;

b. the criterion concept is poorly or incorrectly defined;

c. the criterion is not measured by the instrument employed in a reliable and valid manner;

d. the concept underlying the predicting variable is poorly or incorrectly defined; and

e. the manner in which the underlying predicting concept is realized is poorly defined.

In such a case, the predictor does not validly and/or reliably measure the global concept.

For example, how appropriate are course grades, term marks, standardized tests, cloze tests, true-and-false or multiple choice items as predictors of "true" success in learning a language? Or, if the learning strategy used is not externally observable and verifiable and if the researcher therefore has to rely on the learner's self-report, how much effect has to be ascribed to factors such as the respondent's potential preparedness to lie, to second-guess the researcher, or to repeat simply what someone else had said? The researcher has to beware of "motherhood" statements with which it is hard to disagree and which therefore cannot discriminate, or of putting words into the student's mouth by offering him choices among statements which would have never occurred to him.

In view of these and other problems, it is desirable that studies report as much context as possible to facilitate an assessment of the generalizability of results, and to employ the most stringent standards in statistical processing. Clearly, the larger the sample size and the higher the level of confidence at which a result is declared to be significantly different from zero, the more likely "true" relationships may be said to exist. When such differences do occur under these conditions they are least likely to be artifacts; actually it may be the case that "true" relationships are underestimated and that significant differences would, in fact, be greater if they could be measured more precisely.

Given the complexity of the human research situation, the research context clearly needs to be specified in as much detail as possible. Any one-to-one correlation is naive and possibly spurious; multivariate techniques should be a requirement.

1.4 Cognitive Style

A number of authors have attempted detailed reviews of the various dimensions of cognitive style (e.g., Kogan, 1971); Birckbichler and Omaggio (1978) and Abraham (1978) have discussed these dimensions in relation to second-language learning, and the present summary essentially follows their format.

Two aspects of cognitive style may be observed, viz. a *general cognitive set or disposition vis-à-vis data* (e.g., cognitive flexibility, impulsivity or risk–taking behavior), which deploys the general characteristic features of an individual's cognitive apparatus and which predetermines the actual selection of processing techniques. Other styles exhibit the characteristics of an individual's preference for *general cognitive data processing techniques* (e.g., tendency of an individual to place a typical event in a broad or narrow category, or to blur or sharpen distinctions among events); these characteristics deal with the general manner in which data are handled as compared to the strategies which refer to particular types of processing, such as repeating, generalizing, or monitoring.

1.4.1 Cognitive Flexibility

Learners who show a lack of cognitive flexibility may be convergent thinkers, i.e., they tend to remain within the strict limitations of a task or to focus on the production of a single right answer; they hesitate, stumble over words and cannot find alternate ways of expression (Birckbichler and Omaggio, 1978). No empirical evidence is available as yet on the role of this dimension in second-language learning, but the present study may shed some light on it.

1.4.2 Cognitive Complexity or Simplicity

The concept of cognitive complexity or simplicity, according to Kogan (1971), deals with a variety of cognitive processes; depending on the researcher's definition, cognitive complexity can deal with the number of intervals on a specific dimension (e.g., good — bad) or the differentiation of dimensions and the extent to which they are organized into hierarchies of superordinate or subordinate classes.

1.4.3 Sensory Modality Preferences

It is generally accepted that some students learn more effectively or efficiently if they can see, hear, read or write the material; others visualize the new material for themselves. Reinert (1976) has described four sensory modality preferences which may facilitate the acquisition of new material, viz. *visualization*: this category indicates the relative importance to the learner of actually seeing objects and activities in order for him to learn; the *written word*: a person scoring high on this modality would get more detail from a certain incident by reading a description of it; *listening*: this category indicates the degree to which the individual is able to learn from hearing the spoken language without recourse to some other mode; and *activity*: which refers to the relative importance of some manner of physical activity to the learning process, such as taking notes, writing out exercises or pacing the floor. A person who learns well by, for example, following the teacher's directions to stand up, go to the door, open it, etc. (Green, 1971) presumably prefers activity as a sensory modality.

1.4.4 Impulsivity vs. Reflectivity

Learners who are too impulsive have a "tendency to jump into the task without considering its various components. They are not attentive to detail and do not know how, or are not willing, to take the time to identify the distinctive or salient

features of a learning task or a segment of language. They may lack organizational skills; they are also not overly concerned with the adequacy or accuracy of a response and will often give the first answer they can think of (Birckbichler and Omaggio, 1978).

On the other hand, excessively reflective learners are too attentive to detail and discriminate so finely that they lose the general trend of a listening or reading passage. They are overly concerned with the adequacy or accuracy of their responses and may give too much thought to alternatives before coming to a decision. Although no research can be reported with regard to the effects of impulsivity-reflectivity on success in second-language learning it is useful to note that reflective children apparently are better readers (Kogan, 1971).

1.4.5 Extensiveness of Scanning

Scanning refers to the manner in which individuals deploy attention "leading to individual variation in vividness of experience and the span of awareness" (Messick, 1970, p. 189). Extensive scanners apparently take more time in a learning task (thus showing a similarity with the reflectiveness dimension previously mentioned) out of concern for exactness.

1.4.6 Field Independence

This dimension refers to an "analytical, in contrast to a global, way of perceiving [which] entails a tendency to experience items as discrete from their backgrounds and reflects an ability to overcome the influence of an embedding context" (Abraham, 1978). This concept, the investigation of which was pioneered by Witkin (1962), has received much attention in the research on learning strategies. According to Birckbichler and Omaggio (1978), field-dependent students lack focussing skills, are too easily distracted by detail and cannot distinguish relevant from irrelevant information; they are easily frustrated by extraneous information and are therefore likely to make a task more complex than is necessary.

The empirical findings concerning the role of field independence in second-language learning are not entirely conclusive, according to Bialystok and Froehlich (1978). On the one hand, Tucker et al. (1976) and Naiman et al. (1978) reported a significant positive interaction between field independence and success; in the absence of such a relationship in his study, Brown (1977), on the other hand, postulated that field dependence is related positively only to success in the formal learning context while dependence and empathy may be expected to play a greater role in the process of natural language acquisition.

1.4.7 Adventurousness

Adventurousness, which bears resemblance to Kogan's (1971) "risk-taking vs. cautiousness" dimension, is one of the characteristics ascribed to the good learner by Stern (1975) and Rubin (1975), viz. the willingness to seek out the new, "often willing to appear foolish in order to communicate and get his meaning across" (Rubin, 1975, p. 43). These learners are not easily frustrated and do not lose their confidence even in those situations in which they do not feel entirely secure or in which they are unsure of procedure. Students with a low tolerance of ambiguity give up quickly when the task presents difficulty, doubt or ambiguity, and they cannot hypothesize well (Birckbichler and Omaggio, 1978). Messick's (1970, p. 189) concept of tolerance for incongruous or unrealized experiences, "willingness to accept perceptions at variance with unconventional experience", is likely to be closely associated.

According to Tucker et al. (1976), there is a positive correlation between adventurousness and success in learning French. Wesche (1979), on the other hand, was unable to ascertain such a correlation between success and the attempt to communicate in some way, if necessary, by gestures or with made-up French words or altered English words.

1.4.8 Constricted vs. Flexible Control

Another aspect of cognitive style, which has not been tested out in the field of second-language learning, is constricted versus flexible control, the learner's "susceptibility to distraction and

cognitive interference in tasks containing conflicting cues" (Kogan, 1971, p. 283), except in the larger context of conceptual level presented by Hunt (1971). Apparently, low-conceptual-level students are much more prone to distraction, have a shorter attention span, cannot sit still etc.; in order for them to do well, they need a highly structured learning environment.

1.4.9 Conceptualizing Style

Conceptualizing style refers to "individual differences in the tendency to categorize perceived similarities and differences among stimuli in terms of many differentiated concepts" (Messick, 1970, p. 189). This style refers to a descriptive-analytical, a relation-contextual and a categorical-inferential dimension. Because of the wealth of conflicting results obtained in working with these dimensions, Kogan (1971) cautions that, where conceptual preferences are concerned, "an assumption of near total generality cannot be supported. Generalization of preferred conceptual categories is quite limited, which implies that individual differences in categorization strategy must take account of the specific stimulus materials employed" (p. 266).

1.4.10 Conceptual Level

Hunt's (1971) work with conceptual level has produced most interesting suggestions and research results. Although his model does not fit strictly and exclusively into the category of cognitive learning styles, it is listed here because it is concerned primarily with the cognitive functioning of the student and with a match between his needs and his learning environment. It may be instructive to list some characteristics of students classified as high-, intermediate- or low-conceptual level learners:

1. *low-conceptual-level* students are self-protective and see few alternatives. They have a short attention span; they ask for directions often (they do not rely on themselves or want to think); they are literal and unable to make inferences or interpretations; they have difficulty organizing themselves and their material; they see things in black and white with no gray in between; they want to know the basic information or process and are not interested in sidelights; they are incapable of handling general questions or thinking a problem through; they guess and let it go at that.

2. *intermediate-conceptual-level* students are categorical thinkers. They are reluctant to try anything new; they do not like to appear wrong or dumb; they do not ask questions and are confused by choices; they want to work alone at their own desks; but they go along with what the teacher says.

3. *high-conceptual-level* students are self-reliant and see many alternatives. They question and volunteer additional information; they want to solve things themselves; they don't want the teacher's help until they have exhausted all resources; they are averse to detail and dislike going step-by-step; they are capable of abstract thinking; they do not need concrete objects; they are less afraid of making mistakes than other students; they display greater ability in making interpretations and drawing inferences.

Zampogna, Gentile, Papalia and Silber (1976) investigated this intriguing model in relation to individualized instruction. They found that students with high conceptual level preferred the context of individualized instruction in which they could then also point to higher achievement; on the other hand, students with low conceptual level preferred the more highly structured traditional format of instruction and obtained better results there than in a less structured program.

1.4.11 Breadth of Categorizing

Breadth of categorizing, the tendency of an individual to place a typical event in a broad or narrow category, is one of the general preferences for handling data. According to Birckbichler and Omaggio (1978), a broad categorizer has difficulty in making pertinent distinctions between categories; he tends to overgeneralize by making rules about the second language that subsume too many examples. On the other hand, a narrow categorizer tends to create a rule for every example, a strategy that detracts from his ability to make necessary and accurate generalizations. Consequently, he is often lost in detail and has difficulty in forming concepts.

1.4.12 Leveling vs. Sharpening

Leveling versus sharpening refers to the individual's tendency to refine the details of a learning task. "Levelers show a tendency to assimilate new precepts to previously learned material; in contrast, sharpeners are able to separate memory of prior stimuli and current information" (Kogan, 1971, p. 281).

A most comprehensive approach to the analysis of cognitive style can be found in the Hill model (Hill, 1971). His *Cognitive Preference Inventory* includes the following dimensions: preference for the written word as a source of meaning; preference for visual stimuli other than written word or numbers; preference for reasoning in terms of comparisons, i.e. by citing relationships of similarities between the phenomenon under study and previously experienced phenomena; tendency to reason in terms of classifications, definitions, rules, differences, and relationships (inductive reasoning processes); sensitivity to the feelings of others; ability to positively communicate with others so as to influence their actions; preference for using one's resources as a major determinant of one's actions and responses; preferences for the anonymous authority exercised by associates or peers; identification with family and/or authority figures; ability to accurately assess oneself so as to establish realistic tasks or goals; and ability to see the beauty in surroundings, objects or ideas.

Brown (1973) and Lepke (1977a, b) have investigated the Hill model in relation to second-language learning. While Brown's results were not conclusive, results did support the hypothesis that a child can be taught in various ways depending on his own affective-cognitive map. Although Lepke used a small sample of students, she was able to find a "measurable interdependence between level of achievement in beginning German classes and the instructional adaptation to the learner's cognitive preferences" (1977a, p. 17).

Two comprehensive inventories, which include more dimensions of students' learning behaviour than their cognitive style and which are primarily intended for the teacher so that he may appropriately structure the learning environment, are Papalia's *Learning Modalities Inventory* and *Individual Differences Inventory* (Papalia, 1976, and Papalia and Zampogna, 1977) and the *Learning Style Inventory* (Dunn and Dunn, 1977). These inventories do contain a strong cognitive component, but focus also on areas such as environmental and emotional elements, and on sociological and physical factors of the learning situation. Detailed findings regarding the effectiveness and relative significance of various components of these multi-factor models have not as yet been reported.

From this brief review of various dimensions of cognitive style the conclusion emerges that only a very few have been adequately investigated in relation to second-language learning. Apart from the fact that some dimensions are very difficult to operationalize, another reason for this lack of unequivocal data may well be the fact that researchers interested in applying the constructs of general learning psychology to the second-language learning situation fail to see the obvious, direct relationship between success in learning another language and, for example, the ability to adjust a tilted chair within a tilting room (a picture contained in the Body Adjustment Test, which is used to measure field independence).

Because of the global nature of styles it appears to be a much more valid and productive procedure to focus on isolable strategies which the learner might use consistently or ad hoc to learn various facets of a second language. These strategies, which can be an extension of an individual's dominant cognitive style or which can be consciously added to the behavioral repertoire, are also of greater importance to the teacher because style, being a part of the learner's personality, is much less

accessible to change in the learning environment than are individual strategies. According to Kogan (1971, p. 290), styles which possess the quality of a capacity are more resistant to modification than those which have the property of strategies. Although the teachability question has not been fully resolved (Bialystok, 1979, p. 393), there is evidence that strategies, such as cognitive elaboration, can, in fact, be taught (Weinstein, 1977).

1.5 Cognitive Learning Strategies

Cognitive learning strategies deal with three aspects of the learning process, viz. the *processing of information prior to storage* ("making sense out of the learning material"; "getting to understand it"; "decoding"), the *actual entry of learning material* ("committing it to memory" by correlative subsumption and/or habituation so that it can be recalled when needed), and the *continuous evaluation of a performance after retrieval* ("correcting oneself").

Seven such major strategies have been examined in greater detail by educational researchers; obviously, these do not exhaust the total number of such strategies, which could range from repetition (rote memory, imitation) to multiple discrimination (comparing and contrasting with subsequent abstraction of general principles) and rule-using (application of generalizations and transfer).

1.5.1 Guessing Ahead and Anticipation

In an analysis of reading strategies, Marks (1977), for example, found that the reader's eye moves ahead of what is actually being read while he guesses at what comes next in the sentence. A listener makes predictions about what is to follow in a message on the basis of what he has just heard or on the basis of his own knowledge; he advances hypotheses, as it were, about content and form before their actual occurrence, which can either be confirmed or must be rejected in the light of the actual text.

Students who do not employ this strategy, Brownscombe (1977) maintains, lose their place in the reading material more easily; they don't know what they have just read, they remain passive, do not integrate new material with what is already known and therefore cannot store new material as readily; consequently, a recall of what has been inadequately stored is made more difficult.

1.5.2 Generalization and Transfer

This cluster of strategies refers to the application of a familiar pattern or regularity to a new set of data regarding form and content.

A student who uses generalizations employs the similarities, correspondences and systematicities of language structure for the purpose of getting the meaning of a new word or phrase by, for example, the application of phonological rules or by the derivation of new words from those already known. He is more likely to produce new structures correctly than his peers who do not use generalizations if he is aware of the regularity of the language system. By making and testing hypotheses about the applicability of a generalization he is actively involved in producing a well-ordered internalized grammar.

On the other hand, a learner who does not employ the strategy of generalization will learn each word or structure independently because he does not know how to relate them to each other. He will forget the new material because he has not cognitively subsumed it under known information in the cognitive network and will have to start from the beginning every so often. This type of rote, non-meaningful learning clearly is inefficient, and what is worse, the learning of another language will seem to him to be repetitive, arduous and boring.

It needs to be kept in mind, however, that an excessive tendency towards generalization can lead to incorrect conclusions. Taylor (1974) notes that the learner can incorrectly generalize the structure of his mother tongue to that of the target language as he hypothesizes about the functioning of the other language, for instance, in the order of words in a sentence. According to Taylor's research, the incidence of incorrect

transfer and overgeneralization from L1 to L2 or within L2 differentiated among levels of achievement: beginners tended to commit errors because of incorrect transfer from the mother tongue to the target language; intermediate students, on the other hand, were inclined to generalize excessively (and therefore incorrectly) in the target language.

One aspect of this cognitive learning strategy is the transformation of acquired material and its application to new material as compared to rote, non-meaningful memorization. Goldman and Warren (1973) found, for example, that successful students were more likely to transform material than their less successful peers.

1.5.3 Inferencing

A learning strategy which has received much attention in the last few years, is inferencing, the learner's ability to "maximally exploit available information sources to arrive at new insights into unknown aspects of the target language" (Bialystok and Howard, 1979, p. 7). The information used for this purpose may be of linguistic or extra-linguistic character; it can be provided by the speaker and his non-verbal behavior or by the context, and it may refer to either the structure or the content of an utterance.

A student who uses the learning strategy of inferencing would use the utterance in its entirety to derive meaning and function of unfamiliar components from what is known; he would check other places in the sentence or the paragraph to look for clues as to the meaning and function of a word; he would use illustrations, gestures made by the speaker or objects in the context of the learning episode to arrive at an understanding of the unfamiliar material.

The concept "inferencing", which was originated by Carton (1971), has been extensively studied by Bialystok and co-workers in a number of investigations (for example, Bialystok and Froehlich, 1977; Bialystok and Froehlich, 1978; Bialystok, 1979; and Bialystok, in press). Intuitively, the concept should be of great importance in language learning; however, the actual effect of this strategy on success seems comparatively negligible (e.g., in the 1979 study, inferencing had no effect on

achievement in a grammar task of 75 Grade 10 students who were studying French; in Grade 12, .8% of the variation in the achievement of 68 Grade 12 students could be explained by the effects of inferencing. Apportioned by skill for the entire sample, inferencing accounted for .84% of the variation in reading achievement, .71% in listening, .68% in writing, and .03% in grammar). Yet, Bialystok thinks that inferencing does play a major role in second-language learning; she ascribes the lack of major discernible relationships to inadequate test construction (p. 392).

1.5.4 Translation

Translation as an acquisition-type learning strategy has recently commanded some attention again; as early as 1975, Hosenfeld pointed to the anachronistic nature of the controversy about the role of translation; after all, it is well known that students translate anyway (Kirstein, 1972) whether they are forbidden to do so or not. Hosenfeld (1975) suggested that one should rather study the question of who translates, how often and under which conditions; and above all, one should investigate the effect of the use of translation on second-language acquisition.

In her study of civil servants who were learning French, Wesche (1979) reported that five of her eleven highly successful students employed translation regularly, while several others used it as a last resort.

1.5.5 Cognitive Elaboration

According to Weinstein (1977), cognitive elaboration implies that the learner uses a symbolic construction to add meaning to information he must learn; in other words, new information is made meaningful by forming a relationship between new and familiar material; the learner may do so by the use of logical relationships and pictures or images (Ott, Blake and Butler, 1976). A student who employs cognitive elaboration will try to remember vocabulary or grammar rules through association,

mnemonics or visualization; a student who does not use elaboration is more likely to forget new material because it has not been sufficiently well anchored cognitively. Weinstein (1977) reported that in her study successful learners were more likely to employ this strategy than rote memorization. Wesche's (1979) successful students also claimed to visualize the new situation described by the new words or to relate it to similarly sounding familiar words or rhymes.

1.5.6 Formal and Functional Language Practice

Bialystok, who has extensively investigated these learning strategies, distinguishes between the two language practice situations in the following manner: "Formal language use is concerned with the language code, that is, the language itself as a structured, rule-bound system. Information relating this code regarding syntax, morphology and phonology provides the content for formal language. Functional language, however, is concerned with the use of language in communicated situations. . . .The most functional situation would likely occur outside the classroom in a natural setting where conveying the message is the only essential goal of the language occasion" (Bialystok, 1979, p. 373). Traditional practice such as is involved in completion exercises, the memorization of vocabulary lists and practice of sounds in isolation, on the one hand, and going to the movies, reading books or talking to native speakers, on the other, would be typical examples of the two types of practice.

From the point of view of differences in cognitive functioning, a distinction between formal and functional practice may be made in the extent to which higher-level cognitive operations are performed. Formal practice, as described above, involves mainly memory recall, repetition and the application of linguistic rules in neatly defined contexts (for which an understanding of the meaning of the utterance may or may not be necessary), while functional practice involves extrapolation, synthesis, and divergent or evaluative thinking in addition to the lower-level operations.

According to Bialystok's (1979) results, formal language practice does not materially affect success: for the total sample of 141 students, between one and three percent of the variation

in achievement in reading, listening, writing and grammar can be explained by formal practice effects. Functional language practice, however, is claimed to be a much more effective predictor of success: between seven and nine percent of the variation in achievement in the four skills could be accounted for by the use of functional strategies. This differential effect is especially noticeable in the higher grades. Bialystok concludes that even the formal aspects of the language would be better learned in a communicative context. And indeed, Wesche (1979) was able to report that communication-oriented role play was by far the best predictor of success in her study; 36% of the variation in her 37 subjects' achievement scores could be explained by the variable Role Play.

Yet, voluntary repetition to oneself of sounds, words and so on in French used by the teacher or by other students was also found to be significantly related to achievement in listening and speaking ($r=.33$, $p<.05$) by Wesche (1979). All eleven most successful students said that they repeated new words or phrases aloud to themselves to help them remember. Several students said that when listening to radio or television they would read aloud, while in social situations they did so subvocally.

1.5.7 Monitoring

The concept of monitoring as a cognitive learning strategy is the result of Krashen's (1976) and Bialystok's (1978, 1979) work; according to them, "any language response, including comprehension, may be monitored through reflection upon the formal aspects of the message and concern with its structure. The explicit, formal knowledge that the language learner has obtained may be used in any language encounter to improve the quality of the language" (Bialystok, 1979, p. 375). This strategy — which incidentally is also mentioned as a characteristic of a "good" learner by Rubin (1975) and Stern (1975) — will be used by a student when he plans exactly how he will say something before he says it; he will avoid words or structures he is unsure of and will correct errors he makes while speaking. Furthermore, in written work, he will write only what he knows is correct, will check for spelling or grammar errors and will correct them, will rewrite incorrect parts of an assignment and correct them in his mind (Bialystok, 1979, pp. 378-9).

In evaluating the role which this learning strategy plays in the prediction of achievement, Bialystok admits that monitoring does not seem to be of major significance in reading, listening comprehension and writing; in the area of aural grammar, however, monitoring has a decisive influence, especially in the higher grades (about ten percent of the variation in this achievement score could be accounted for by the effects of monitoring). She suspects that the success criteria, especially in the area of writing skills, could have been more precisely and validly defined.

Wesche (1979) was also unable to obtain a correlation between achievement and voluntary repetition of the instructor's correction; but, of course, this strategy does not represent monitoring in the true sense of the term. Yet another strategy, viz. to emphasize accuracy, to stop in mid-sentence to think or ask for help before proceeding (which would, in fact, be a monitoring strategy) also failed to be systematically related to achievement.

1.6 Conclusions

This brief review of the state of knowledge about the role of learning strategies for the prediction of success in second-language learning permits a number of significant conclusions:

1. It appears possible to define, isolate and observe learning strategies which are associated with success in a variety of learning situations.

2. However, there is often a discrepancy between the theoretical role predicted for a certain strategy and its actual significance as determined by empirical research. Furthermore, the results obtained for the same or similar strategies do not show — probably for methodological reasons — as much congruence as one could expect.

3. The more specifically defined the strategy, the better the chances to identify its relationship with success. Global dimensions, as they are involved in conceptualizations of cognitive style, such as impulsivity, adventurousness, field dependence and the like, either yield no consistent relationship to success at all, or those observed cannot be

generated or replicated because their occurrence appears to be limited to specified learning contexts. Therefore an approach, such as Bialystok's or Wesche's, which aims at the identification of specific observable as well as covert strategies, is more promising for methodological as well as conceptual reasons. The pedagogical benefits are also more likely to be greater because the teacher as well as the student can be in better control over the acquisition and use of such strategies, while this is not the case with global dimensions.

4. In order to be able to verify results obtained by a number of researchers, it is necessary to validate their generalizability in a clearly defined learning environment with as many different samples and sample treatments as possible. The present study will attempt to do just that: it will present the use of learning strategies employed by students while they are practising in the language laboratory; 19 different courses, 4 different languages, 3 levels and two universities with a total of 455 students will be involved; because of the presumed complexity of the naturalistic learning situation in which many factors may contribute to a learner's success or failure, the study will include certain other standard predictors of success against which the contribution of learning strategies to the prediction of achievement can be weighed.

2. RESEARCH PROCEDURES

This chapter presents the pilot and the final questionnaires which were used as the basis for this study. After a description of the instrument, the results of Part I (Student Background) and Part II (Student Learning Strategies in the Language Laboratory) are given and discussed. Finally, the results obtained for each group of learning strategies are analyzed.

2.1 The Questionnaire

The final questionnaire was set up after a preliminary pilot; the procedures followed to prepare the initial instrument are described here.

2.1.1 Compiling the Questionnaire

Open-ended interviews with 23 students enrolled in beginning and intermediate French and German language courses were conducted by the authors in October and November 1977. Achievement levels for these students ranged from low to excellent; however, since they were volunteers it may be assumed that their motivation to learn the foreign language was high; their attitude towards the course, the instructor and the second language presumably was also more positive than neutral or negative. It seems therefore safe to generalize that the student population providing insights into their own learning strategies consisted of cooperative students who had a real interest in the language and in learning it although they might not have been very successful at it.

These students were encouraged to describe in detail what they did when they worked in the language laboratory, more specifically the procedures which they used when dealing with spoken material. The emphasis was to be on *how* they went

about their activities rather than on *what* they did while studying. The interviews followed, in principle, the format suggested by Hosenfeld (1976). Interviewer questions were deliberately non-directive in nature; statements and comments only served to clarify a student's remarks when the content transmitted was not clear.

The tape recordings were then analyzed for statements embodying learner strategies; 96 such statements were obtained in this manner. The research team scrutinized these statements for clarity of expression, for ambiguity and overlaps of content, for double-barrelled questions where students might be unsure about what they were supposed to respond to, and finally for evaluative statements which did not really describe strategies as such. An unbiased educational researcher read the resulting questionnaire critically, and a final version of 64 items was compiled. Background information items which appeared of interest to the team (such as measures of attitude, motivation, perseverance, exposure to another language in formal as well as informal learning environments, exposure to grammatical terminology) were added, and the entire questionnaire was distributed to instructors who had agreed to administer it to volunteering students. From the returns, 169 questionnaires from students in 17 different language courses could be used as the basis for further analysis.

As this step in the project was only intended to serve as a field test of the questionnaire, not all steps in the data analysis were undertaken with all classes; a summary of results is reported briefly in the Appendix. Results obtained for students in the German courses are reported elsewhere (Prokop, 1978 and 1979).

An inspection of the results and comments made by the students revealed several weaknesses in the original questionnaire. It was therefore refined in clarity and brevity. Fifteen students not enrolled in a language lab course section agreed to make critical comments, and their suggestions were also considered for the final version of 47 items. For data-processing reasons, a body of 38 statements forms the basis for this study (see Appendix for a reproduction of the questionnaire).

2.1.2 Description of the Questionnaire

The questionnaire consists of two parts, the first one dealing with questions concerning the academic background and the attitude and motivation of the participants, and the second one with learner strategies.

Part One sought information on a number of student variables, namely the type of motivation for taking a second-language course (generalized, instrumental, integrative, intellectual, compulsoriness of the course in the student's program), previous marks in the most recent English and Mathematics/Science course in high school or at the university, and competence in playing a musical instrument or in singing. Furthermore, students were asked to indicate the number of years during which they had studied one or more foreign language(s)[1] at school or at the university, and the extent to which knowledge of this foreign language had been acquired in a course, in the home or the country or province where it is spoken. Another question concerned the extent to which the instructor in a previous language course, if any, had described and explained a grammatical or pronunciation difficulty before he had started to work on it through drills in the classroom or the language laboratory.

These items on background information were designed to allow the identification of the relative effects of a number of variables which the professional literature has recognized as being of significance in the prediction of success in second-language learning; it was thought that these major variables would have to be specified explicitly and taken into consideration in the statistical analysis so that major effects and interaction effects could be properly identified; if they were not included in the data analysis one would be in a much weaker position in maintaining that certain effects were "caused" by learner strategies alone rather than by a mixture of motivation, attitude, perseverance as well as other variables.

Part Two comprises statements embodying learner strategies which the respondents were requested to evaluate. A legend

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[1] The term "foreign language" will be used occasionally for stylistic reasons rather than the preferred "second language".

preceding the statements identifies "1" as "always; agree strongly"; "2" as "usually; agree"; "3" as "seldom; disagree"; "4" as "never; disagree strongly". When the student wanted to express an "I don't know; undecided" he was to circle a "5". An example of a questionnaire item is:

1. During lab practice, I concentrate more on the quickness and smoothness of my response than on its accuracy. 1 2 3 4 5 6

Since students came from a variety of courses which presumably used different methodologies and suggested different study experiences in the language laboratory, it was unreasonable to expect all students to have had an opportunity to experience all learning strategies listed in the questionnaire. To deal with this situation, they were asked to rate those items which were not part of their regular laboratory practice program in terms of the point of view expressed by: "If I had used this strategy, how important would it have been to me?" and to circle a "6" as an indication of "hypothetical" use rather than "actual" use, this in addition to the evaluation criterion itself. The evaluation indicated in the following manner, for example:

1 (2) 3 4 5 (6)

meant a student evaluated a particular strategy as one with which he "agreed" (2), considering it potentially important and useful although he had not actually used it (6) while studying in the language laboratory.

2.1.3 Groups of Student Background Variables

By grouping the student background variables according to shared characteristics the following categories are obtained:

1. *Cognitive skills and aptitudes.*
   a. *Verbal skills.* The mark in the most recent English course was sought as a measure of the learner's aptitude to read for meaning, to isolate new vocabulary and structures and to reintegrate them meaningfully, to choose the appropriate words for given contexts,

etc., and to order thoughts systematically by written and oral paragraphing.

The role of English verbal skills has been investigated extensively; yet there is little agreement on their contribution to an explanation of foreign language achievement. Pimsleur et al. (1964), for example, conclude after a review of the relevant studies that the correlation between foreign language grade and English can be estimated to be about .57. Hascall's (1961), Kangas' (1965) and von Wittich's (1962) studies show total grade point average, English and second language marks to be highly correlated; in fact, GPA and English may be better predictors than IQ scores. Von Wittich (1962) concluded that English GPA was the second highest predictor ($r = .6623$) after total GPA. Verbal ability was also established as a major predictor by Pimsleur, Stockwell and Comrey (1962), Gardner and Lambert (1965), Sako (1965), and Nardi (1947). Native language skills as measured by certain parts of the Modern Language Aptitude Test (e.g., Words in Sentences, Paired Associates, Spelling Clues) have been shown to be a significant predictor of achievement by, for example, Gardner (1965), Payne and Vaughn (1967), and Cooper (1964).

b. *Logical skills.* The most recent mathematics or science mark was expected to provide information about the students' analytical skills, their problem-solving ability, the capacity to generalize rules, to apply previously acquired knowledge to new situations as well as the ability to categorize, induce and deduce.

This factor has traditionally been measured by the students' I.Q., and a large number of studies have been carried out to determine the relative importance of this variable in the prediction of achievement. Pimsleur et al. (1964) estimated it, after a thorough review of the existing literature, to be in the order of $r = .46$; von Wittich (1962) obtained a correlation of .48 between I.Q. and foreign language grade. The same variable was also identified by Gardner and Lambert (1965) and by Payne and Vaughn (1967) who had used the Mathematics section of the CEEB as one of the predictors.

c. *Musical skills.* Many aptitude tests have used the general factor "phonetic perception" in some fashion (e.g., phonetic discrimination in the Modern Language Aptitude Test: Gardner, 1965). Musical talents have been found to be of some influence (Blickenstaff, 1963; Eterno, 1961), but more commonly, pitch and timbre discrimination are shown to be of some import (Leutenegger, Mueller and Wershow, 1965; Pimsleur, Mosberg and Morrison, 1962). Dexter (1934) had already concluded that comparatively low I.Q., combined with good pitch discrimination, seemed to result in reasonably successful work in French; whereas corresponding low I.Q. accompanied by low ability to discriminate pitch seemed to lead to failure in French. Leutenegger and Mueller (1964) determined a correlation of .27 between the pitch subtest on the frequently used Seashore Measures of Musical Talent with laboratory scores involving identification of speech sounds embedded in a multiplicity of items; the loudness, rhythm, tonal and timbre sections showed even less relationship between achievement and the hypothesized musical skills.

d. *Terminological knowledge.* Knowledge of grammatical terminology as measured by the reported incidence of grammar explanations before or after an oral drill session, at least for some courses, appeared to be a meaningful predictor because it would reflect an individual's ability to manipulate structures consciously.

2. *Language background.* Three parameters of background in a second language were adopted as potentially important predictors:

   a. *Place of acquisition of the second language.* The context in which a language is learned (e.g., in a course, at home, or in the country or province where it is spoken) is hypothesized to have some significance for the acquisition process itself, especially with regard to the strategies which a learner might use in coming to terms with the other language.

b. *Fluency in a third or fourth language.* It was hypothesized by the authors that knowledge of one foreign language — whether acquired in a formal or an informal learning situation — might facilitate the acquisition of another foreign language inasmuch as the learner will already — consciously or unconsciously — have developed a certain approach to learning a second language.

c. *Years of study of a first or second foreign language at school or university.* The length of time spent on learning a second language may be thought to play a role in the development of well-defined approaches to the learning task.

The empirical evidence supporting this hypothesis is not very strong, however. Payne and Vaughn (1967), for example, reported that the number of years of language training in either high school or college, or the amount of Italian course work did not show any appreciable correlation with the success criteria, while Dunkel (1948) did conclude that a year or more of training in one foreign language seemed to give some help in learning another language. Carroll (1963) concluded his review of the evidence that studies have not really controlled adequately for language aptitude: ". . . the authors had collected data on students who elected a second foreign language; such students are likely to be those who have been successful in studying their first foreign language and have therefore, ipso facto, demonstrated a degree of aptitude which will also predict success in the second foreign language" (p. 1090).

3. *Motivation.* A large amount of the criterion variance may be ascribed to non-cognitive factors (e.g., Jakobovits, 1970, estimated it to be about one-third of the total variation in achievement to be explained); and motivation has been found in a number of cases to be a very good predictor of success.

a. *General desire to learn the other language.* This general desire to acquire a second language implies an interest, "a personal responsibility" for learning which has been isolated by Stern (1975) as one of the qualities of the good language learner.

b. *Career or instrumental orientation* is an "interest in acquiring the other language for utilitarian purposes", such as better job opportunities, need for the second language in research, in trade, and for travelling purposes (Gardner, Smythe, Clément and Gliksman, 1976).

c. *Integrative orientation.* This type of motivation, which has been investigated extensively by Gardner and Lambert and co-workers (e.g., Gardner and Lambert, 1972; Feenstra, 1969; and recently, Naiman et al., 1978), refers to a "high level of drive on the part of the individual to acquire the language of a valued second-language community in order to facilitate communication with that group" (Gardner, et al., 1976, p. 199).

Although there is no complete agreement in the literature it does appear that integrative motivation is related positively to success in second-language learning and that it is a stronger motivating force than instrumental motivation; discrepancies in the results appear to be due to differing learning contexts and differing expectations for the usefulness of the language learned (Stern and Cummings, 1981).

d. *Intellectual and/or aesthetic interest in learning the other language.* Especially for students at the university level, this variable may be of considerable interest and may have a motivating force which is not ordinarily encountered in the school context.

4. *Course factors.* The consideration appeared important whether or not the course taken was required for the student's program or whether it was taken out of genuine interest; clearly a relationship between compulsoriness of course and motivation can be hypothesized.

5. *Learning strategies.* This study will attempt to isolate groups of learning strategies which students employ while they study in the language laboratory. In later sections, reference will be made repeatedly to the relationship between success and the use of such strategies.

2.1.4 Student Population and Sample Characteristics

Two universities served as the source of the student population evaluating the questionnaire: the University of Alberta and the University of Victoria, British Columbia, Canada. In the former, a total of 325 students in beginners' courses (German, Japanese, Chinese), intermediate courses (French, Japanese, and Chinese), advanced courses in French, and a Romance Linguistics course returned the questionnaire.

At the University of Victoria, students in beginners and intermediate language courses in French and German as well as beginners, intermediate and advanced students taking a civil service training course in French supplied a total of 130 students.

Thus a total of 455 students answered the final questionnaire. There were 345 students learning French at the beginning, intermediate and advanced levels, 58 students engaged in learning German at the beginners and intermediate levels, 33 students in Japanese beginners and intermediate courses, and 19 students were studying Chinese as beginners or spoke a Chinese dialect.

A profile of the sample follows which may be used when analyzing the results concerning learner strategies (Part II) so as to establish, whenever possible, relationships between students' background and the chosen strategies (see Tables 1 and 2 in the Appendix).

Place of acquisition of the first foreign language: The vast majority of the 455 students who returned the questionnaire said they had learned the foreign language mostly in courses: only 23 students stated that they had acquired it mostly in the family context, and another 30 students had learned the foreign language mostly in the province or the country in which it is spoken. Fifty-six students claimed *fluency in a third or fourth language.*

Regarding the students' academic record, 97 students claimed a superior *mark in the most recent English course* in high school or at the university; 159 had obtained very good and 112 students good results; 39 students responding had achieved

average or below average marks in an English course. The distribution for the *most recent Math or Science mark* was similar, except that there were 137 "superior" and only 128 "very good" students in this category. About one-half of the students claimed to have a *certain competence in playing a musical instrument or in singing.*

In response to the question *how many years had been spent in studying a first foreign language in high school*, about 15% of the students said they had had no foreign language at all. The largest number (about 20%) had had three years, about 12% each had taken five and six years, respectively, about 10% had been enrolled in another language course for nine or more years; the remaining students were distributed about evenly among the other categories of years of second language background. A total of 374 students did not have *a second foreign language in high school*, and about 25 students each had had either one, two, three or more years of such language background.

About 5% of the students had taken three or more years of a *first foreign language at the university*, 77 had two years; the remainder had either one complete year or only part of the year at the university.

Only 53 students said that they had had one year of a *second foreign language at the university*, and 18 students had two or more years of a *second foreign language at the university.*

For about 10% of the students, the *language course* in which they were enrolled when completing the questionnaire was *compulsory.*

In the complex of questions dealing with a student's *motivation to take a foreign language* (*second language*), the following results were obtained:

1. A very strong desire to learn the other language was claimed by 179 students, and 176 students expressed a strong desire to learn it, while 80 students said they had an only average or below-average desire to learn the other language.

2. Sixty students agreed very strongly with the statement that they were taking the other language because it might help them in their career later on; 193 students agreed, while the remainder disagreed with this statement.

3. Integrative motivation, that is the desire to learn the other language so that one can communicate with its speakers,

understand their thoughts and ways of behaving and can be like them, was shown very strongly by 94 students; 289 agreed with this explanation of their motivation for enrolling in a foreign language course; 41 students did not claim any such motivation.

4. Cultural interest (learning the other language for the purpose of being able to better enjoy the literature and the artistic and intellectual achievements of the other culture) was given as a very strong motivator by about 15% of the students, as a motivator by another 40%, while the remaining 45% did not see themselves thus motivated.

The question *to which extent the highschool teacher or university instructor in a previous foreign language course had explained a grammar or pronunciation difficulty before or after drill practice* was answered in the following manner: 35 students claimed "never" to have received any such explanation, 89 students "seldom", while 144 students reported receiving such explanations "usually", and 69 students said they "always" got such instruction.

2.1.5 The Learning Strategies: Pattern of Responses to the 38 Items

The response means were computed (the undecided rating was given the value 2.5) and averaged over all 455 students. Averages can be interpreted as follows:

strong agreement	1.00-1.75
agreement	1.76-2.25
neutral	2.26-2.75
disagreement	2.76-3.25
strong disagreement	3.26-4.00

The results show that in only one strategy (22: When I listen to a recording of my own voice I concentrate on comparing my pronunciation and grammar with that of the model) strong agreement could be observed (mean of 1.75); on 18 strategies, agreement was elicited; on 11 further strategies students gave a

neutral response; 7 learning strategies elicited disagreement; and finally only one strategy was met with strong disagreement (6: I use the dictionary while I am working in the lab: mean of 3.49).

An inspection of the items and the distribution of the five kinds of responses to them reveals that most of them discriminate well; no item elicits only positive or negative responses. There are items, however, where the number of positive (strong agreement and agreement) evaluations exceeds by far the negative responses (e.g., Items 5, 10, 16, 20) in the order of 90% vs. 10%. The question must remain in one's mind whether the statements reflected true alternatives or whether they are to be regarded as "motherhood statements" with which anyone would find it difficult to disagree.

2.2 Establishing The Data Base

One of the main objectives of this study is to determine whether there are consistencies in student responses to the various questionnaire items which would permit the conclusion that there are underlying principles of which learning strategies are individual realizations. Such an investigation for patterns of responses among items can be carried out by a factor analysis of item intercorrelations.

2.2.1 Factor Analysis

The first step in a Varimax factor analysis revealed the existence of fourteen factors with eigenvalues greater than 1, accounting for a cumulative variance of 56%. An inspection of the factor loadings indicated low meaningfulness of the latent factor structure. Therefore the eigenvalues were plotted against associated factors (Figure 1); quite clearly there is a sharp break curve (a flattening of the curve at which each factor contributes materially to the total variance to be accounted for) at four factors indicating the possible parsimonious existence of a simple factor structure with four factors.

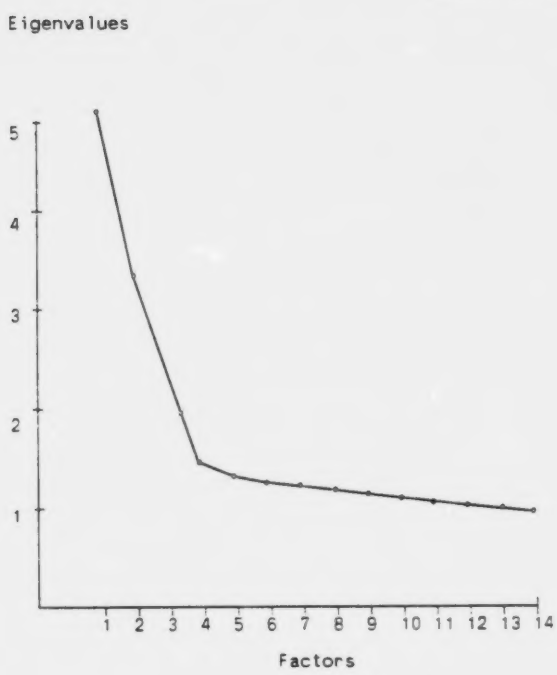

FIGURE 1 Distribution of eigenvalues

However, only about 30% of the variance could be accounted for by these four factors; about a third of the items loaded significantly on the first three, while there were no loadings at all on Factor 4 if the usual levels are used. The three factors would have resulted in three meaningful constructs. However, because of the low participation rate and the low percentage of total variance explained an attempt was made to find that structure which would increase maximally these parameters and which would still be meaningful for purposes of interpretation.

To obtain evidence of the simplest factor structure possible, separate analyses were performed for three to eight factors; in each case, items with unequivocal factor loadings of at least .40 were grouped into tentative factors. Subsequently, each factor from the three-factor solution was followed through to the eight-factor solution with a view to determining how and when a given factor would break up into smaller factors. The item assignment to the various factors did not change from the three-

to the five-factor solution at all; at the six-factor solution, the strongest factor broke into two meaningful factors, while two other new factors were also constituted. No further change occurred for the seven-factor or the eight-factor solution. This result indicated that the six-factor solution was the most appropriate if meaningfulness as well as simple structure are the criteria to be used for the determination of the number of factors with which a maximum of variation in response characteristics can be accounted for.

The total variance explained by the original 14 factors amounted to 56%, while in the six-factor solution chosen the variance explained for the 455 students was almost 40%; of the 40%, the first factor accounted for about 13%, the second about 8%, the third about 6%, and Factors 4, 5 and 6 about 4% each (see Table 4 in the Appendix).

It should be noted that the three original meaningful factors are still maintained conceptually in the six-factor solution. Twenty—one of the 38 items are well defined and load with a minimum of .40; a further 10 items have factor loadings exceeding .30. Although Factor 6 is represented only very weakly in terms of unequivocal and substantial loadings (see discussion below) the factor structure is simple and conceptually meaningful.

unequivocal and substantial loadings and after labeling, the variables which had shown loadings on more than one factor were scrutinized for potential assignment to one of the six factors. In practically all cases, instances of double loadings reflected a conceptual reality.

The remaining analysis of the data was conducted with factor scores (see 2.2.5), which were built using not only terms for the highly loading variables, but also for those with low loadings in order to obtain the best estimate of a given factor. In the discussion below, concepts will be examined not only in terms of overall structure, but also as realizations of individual strategies wherever this is meaningful.

2.2.2 Interpretation of the Factors

The factor analysis of the responses to the 38 items constituting the questionnaire revealed the existence of six meaningful factors which were labeled: Reading, Attention to

Task Features, Writing, Use of Contextual Clues, Global Approach to Understanding, and Cognitive Flexibility.

Factor 1 — Reading (See Table 1)

This factor comprises learning strategies which indicate the use of reading by students engaged in language laboratory activities.

TABLE 1
Composition of Factor 1 (Reading)

Learning Strategy	Description	Mean	S.D.
15	When I listen to new material in the lab, I read along in the book to connect the sounds with the printed word.	2.37	1.03
23	By following along in the book I can understand the tape better.	1.79	.85
26	I keep my book open while I practise lab exercises because that way I can look at the instructions quickly if I need to.	2.45	.95
30	When I do lab exercises I read the next drill item in my book before it is said on tape.	2.78	.86
33	I have to have some prior knowledge of the content of a recorded passage in order to recognize the individual sentence elements.	2.30	.88
36	I read along with the tape from the beginning when I do my lab exercises.	2.56	.97

Although Strategy 33 does not seem to have a direct bearing on the concept of Factor 1, it is also included here as it can be interpreted as referring to having read a text before listening to it, in addition to the possibility of having an auditory memory of it.

The average student evaluation of the frequency and usefulness of strategies composing this factor as a whole as expressed by the unweighted item mean average was only

slightly positive (2.38). There was strong agreement with the idea that by reading along in the text students could understand the tape better (1.79), but they disagreed slightly with the notion that they read the next drill item in the book before it was said on the tape. However, all other strategies received a rather neutral evaluation, which was not produced by a high percentage of "I don't know's". For example, reading along with the tape from the beginning was given a very high frequency rating by 67 students, a high rating by 124 students, 77 students said they read along "seldom" from the beginning, and 102 students said that they "never" read along with the text from the beginning. Yet, an average of 63 students of the 455 students responded with an "undecided ; I don't know" to the six strategies of which the Reading factor is composed.

The strong support for reading along in the book while working in the language laboratory may be explained by the importance given to the written word in school as contrasted with the minor role of developing listening skills. Despite the evolution of teaching methodologies, written work still plays an important part, due maybe to its longer existence in teaching languages. It is also quite possible that students use reading as a crutch, believing that they can understand better by reading than by listening alone.

Factor 2 — Attention to task features

An analysis of the ideas expressed by the strategies grouped under this factor reveals a willingness or a readiness to pay attention to specific features of the learning task. For example, it involves concentrating on the grammar principle, on the pronunciation of difficult sounds, on understanding constructions and vocabulary while practising, and on comparing one's own pronunciation with that of the model. Students prepare a new text before listening to it or check out known words before they listen a second time. They think along as they practise, they do not merely parrot; they record an exercise on tape and listen to it many times — if necessary — to learn an expression or structure. Such practice, for them, fixes correct responses in their mind; in this way, they establish a grammar pattern in their mind.

TABLE 2
Composition of Factor 2
(Attention to Task Features)

Learning Strategy	Description	Mean	S.D.
1	During lab practice, I concentrate more on quickness and smoothness of my response than on its accuracy.	2.84	.68
7	I try to be aware of which grammatical constructions give me greatest trouble; this way I can pay special attention to them while I listen and practise.	2.10	.72
9	I study very carefully all new texts before I listen to a recording of them; I make sure that I understand the constructions and know the vocabulary.	2.61	.83
20	In a four-phase drill (master-student-master-student) I repeat aloud the confirming master response: that second repetition fixes the correct response better in my mind.	1.81	.79
22	When I listen to a recording of my own voice I concentrate on comparing my pronunciation and grammar with that of the model.	1.75	.78
25	When I have an oral assignment I find it helpful to record the whole exercise on tape and then to listen to it many times and to make changes and corrections as I go along.	2.11	.87
28	By repetition of sentences in the lab I establish a grammar pattern in my mind.	1.90	.70
29	I try to be aware of which sounds give me the greatest trouble; this way I can pay special attention to them while I listen and practise.	1.89	.70
31	I concentrate on the grammar principle involved while I do grammar drills in the lab.	1.97	.71
32	I repeat after the model and practise it many times, if necessary, to learn an expression or structure.	1.96	.70
34	When I repeat words or sentences in lab exercises I concentrate totally on mimicking their acoustic form; I don't "think" while I am doing them.	2.94	.84
35	When I don't understand some words on a tape I check them out before I listen a second time.	2.31	.80

There were three strategies which received a negative evaluation from the students (Concentrating on quickness and smoothness of response rather than on its accuracy; studying carefully new texts before listening to a recording of them; and concentrating totally on mimicking the acoustic form of words or sentences when repeating them in lab exercises). Students agreed most strongly (1.75) with the idea that they concentrate on comparing their pronunciation and grammar with that of the model when listening to a recording of their voice (Strategy 22). There were fewer "Undecided" evaluations than occurred on Factor 1.

The overall concept underlying this factor appears to be a mobilization of cognitive effort, not only in the analysis for purposes of recognition, but also in an effort to habituate new learnings; students certainly did not favor unthinking parroting. It is interesting to note the importance given by students to their ability to compare their own production to that of the model. Furthermore — although repetition is used frequently — it is a conscious one entailing the thought process which enables the learner to develop skill in automatic sentence formation.

Factor 3 — Writing

Strategies relating to writing have been grouped under this factor; included is also the strategy of using the dictionary.

Using written support in the learning process was generally rejected (factor mean 2.95 on a scale of from 1 to 4); the strongest rejection came for the dictionary-using strategy (3.49), while the idea of writing down individual words for the purpose of checking them out later received an undecided evaluation (2.46).

Clearly the students felt that writing was not an appropriate strategy for the development of oral/aural skills; this belief agrees, of course, with standard practices in language laboratory work.

TABLE 3
Composition of Factor 3 (Writing)

Learning Strategy	Description	Mean	S.D.
6	I use the dictionary while I am working in the lab.	3.49	.79
13	In listening to a taped conversation I pick out key words and write them down.	2.95	.90
14	When I work in the lab I take notes.	2.79	.92
21	When I get stuck on individual words in listening to new materials I write them down and check on them later.	2.46	.97
38	Before I respond orally to questions on a text I write out the answers.	3.08	.83

Factor 4 — Use of contextual clues

Ten items with high loadings define this factor. The dominant principle is the use of contextual clues in the learning process as expressed especially in Strategy 2 (seeing the picture of a situation or visualizing it in my mind), 3 (using context to determine meaning), 8 (associating new words with actual situations), 17 (anticipating what will come next), 18 (identifying individual elements and putting them together later in one's mind), 19 (thinking of key words around which one builds an oral response), and 24 (paying special attention to the words and phrases people have selected for a particular situation). Interpreting Item 37 offers some difficulty; yet "committing new material to memory by saying it aloud a number of times" presumably also does involve the use of context.

The average item evaluation for this factor was 2.14, indicating agreement with the frequency and usefulness of these strategies. Strongest agreement was expressed with the idea that students use the context to determine the meaning of a new word (1.79), while on the other end of the scale, anticipation of what will come next received a neutral evaluation (2.56).

TABLE 4
Composition of Factor 4
(Use of Contextual Clues)

Learning Strategy	Description	Mean	S.D.
2	Seeing the picture of a situation or visualizing it in my mind helps me remember the spoken material associated with the situation.	2.03	.68
3	In order to be able to remember words I must practise them in a phrase or sentence; I don't remember isolated words so well.	2.43	.86
5	When I don't understand a word I use the context in which it occurs to determine the meaning.	1.79	.67
8	In order to learn new words, I attempt to associate them with actual situations.	2.20	.79
16	During lab practice, I listen for critical features in a question because more often than not I can use them in my answers.	1.79	.71
17	When I listen to a spoken text in the lab I try to anticipate what will come next in an utterance.	2.56	.80
18	When I listen to a spoken text in the lab I identify individual elements of the message first and then I put them together in my mind.	2.35	.71
19	For answers to lab questions about a text I think of key words around which I can then build an oral response.	2.08	.67
24	When listening to a taped conversation I pay special attention to the words and phrases the people have selected for that particular situation.	2.20	.73
37	In order to commit new material to memory I say it aloud a number of times.	1.98	.74

It should be noted that Strategy 24 also loads on Factor 2 (Attention to Task Features), as it should from the point of view of semantic content.

The value of contextual clues for the purpose of determining the meaning of an unknown word and discovering critical features which will facilitate finding the answer is recognized by the learner. This attitude towards the various strategies bearing on the use of contextual clues — whether visual or aural — indicates that the students are conscious of their significance for developing second language proficiency.

Factor 5 — Global approach to understanding

Four strategies which express the idea of a global approach to understanding define this factor. "Taking in overall meaning without picking out key words" (Strategy 11) and "listening to the entire paragraph first without being concerned with every detail right away" (Strategy 27) are contrasted with a concentration on detailed analysis. Students agreed with the usefulness of this complex of strategies (average of 2.06 response strength), although they were neutral in their evaluation of "picking out key words in listening to taped conversations and stories and repeating them to themselves" (2.56).

It should be noted that Strategy 27 was considered particularly valuable, which seems to indicate that students have grasped the value of a global approach to understanding as compared with the splitting up of sentences into smaller units which often lose their meaning in isolation.

TABLE 5
Composition of Factor 5
(Global Approach to Understanding)

Learning Strategy	Description	Mean	S.D.
10	During lab practice, I concentrate more on getting the answer right than on being original.	1.80	.69
11	In listening to a taped conversation or stories I take in the overall meaning without picking out key words.	2.15	.84
12	In listening to a taped conversation or stories I pick out key words and repeat them to myself.	2.56	.76
27	When I listen to a tape I listen to the entire paragraph or story first without being concerned with every detail right away; I pay special attention to details in a second or third listening attempt.	1.84	.68

Factor 6 — Cognitive flexibility

This factor offers major difficulties in definition and interpretation. It consists really of only one item which loads unequivocally (factor loadings of essentially zero or .10 on the other factors), viz. that students first formulate the answer to themselves in their native language before responding to cues. Yet this loading is only .28 — which is hardly a significant loading and which would ordinarily be neglected in the first-round item assignment to factors. The concept underlying this particular item, Translating, is also not backed up by any other learning strategies.

Thus an inspection was made of those items which — although already assigned to other factors — also loaded on Factor 6. The following results are obtained: Prior to actual laboratory work, students maintained that they did not prepare new texts before such work (Strategy 9) and that they did not have to have prior knowledge of the content of a recorded passage in order to be able to recognize individual elements (Strategy 33); they tried to anticipate what would come next in the utterance (Strategy 17), and read the next drill item before hearing it (Strategy 30). When working in the lab they took in the overall meaning without picking out key words (Strategy 11); they did not identify individual sentence elements and put them together again in their minds (Strategy 18); rather, they used the context to determine the meaning of an unfamiliar word or phrase (Strategy 5). While they practised they concentrated on the grammar principle (Strategy 31); in any case, they did not formulate their response in the native language before actually articulating it (Strategy 4).

One may generalize that the students were self-reliant in their approach to the learning task because they thought they would be able to handle the material without preparation; but they took a calculated risk because they planned ahead and read ahead — commonly thought of as being strategies used by good learners; they were determined to operate within the language system and to exploit fully the language system by using the overall context. And in all practice, they remained conscious of the structural features involved in what they were expected to practice.

Planning, linguistic awareness and use of the language context represent different dimensions of the language learning process discussed previously with other factors. The fact that these strategies coalesce into one factor (which meaningfully reflects an ability to switch among strategies when required rather than to adhere to one or the other throughout an exercise) led the authors to label the factor "cognitive flexibility"; the overall evaluation of the factor by the 455 students as expressed by an unweighted average of the item means was 2.37, which represents only weak agreement with the frequency and usefulness of such strategies.

TABLE 6
Composition of Factor 6
(Cognitive Flexibility)

Learning Strategy	Description	Mean	S.D.
4	When I respond to cues in lab exercises I first formulate the answer to myself in my native language.	2.82	.86
5	When I don't understand a word I use the context in which it occurs to determine its meaning.	1.79	.67
9	I study very carefully all new texts before I listen to a recording of them; I make sure that I understand the constructions and know the vocabulary.	2.61	.85
11	I take in the overall meaning without picking out key words when listening to a taped conversation or stories.	2.15	.84
17	When I listen to a spoken text in the lab I try to anticipate what will come next in an utterance.	2.56	.80
18	When I listen to a spoken text in the lab I identify individual elements of the message first and then I put them together in my mind.	2.35	.71
30	When I do lab exercises I read the next drill item in my book before it is said on tape.	2.78	.86
31	I concentrate on the grammar principle involved while I do grammar drills in the lab.	1.97	.71
33	I have to have some prior knowledge of the content of a recorded passage in order to recognize the individual sentence elements.	2.30	.88

2.2.3 Clarity of the Factor Concepts

One measure of the extent to which the students perceived the learning strategies to be both well-defined and frequent is the number of "undecided" evaluations generated (see Table 5 in the Appendix). An average of about 63 students of the 455 students responded with an "undecided; I don't know" to the six strategies of which the Reading Factor is composed; Factor 2 (Attention to task features) generated approximately 41 such ratings per item; Factor 3 (Writing) produced 47, Factor 4 (Using contextual clues) 33 undecided evaluations; Factor 5 (Global approach) showed an item average of 45 undecided ratings, and Factor 6 (Cognitive Flexibility) an average of 38. If Factor 6 is disregarded altogether (after all, it consists of only one reasonably highly loading variable), it becomes evident that Factors 2, 3, and 5 generated about 10% undecided evaluations, Factor 4 about seven percent, while Factor 1 produced twice as many. One may conclude that the use of contextual clues, for example, was less uncertain in the students' mind than, particularly, the reading strategies. It should be noted here (see 2.2.6) that in one course no written materials were, in fact, available, which would explain the high number of undecided ratings for this factor.

2.2.4 Factor Structure

The six factors isolated above can be grouped in two broad divisions, viz. those which involve the primary activities of manipulation of language content and structure (Attention to Task Detail, Use of Contextual Clues, Global Approach, Cognitive Flexibility) and those psychomotor strategies which support the primary activities (viz. Reading and Writing).

The primary cognitive strategies may be conceptualized as being located on a bipolar continuum which ranges from conscious attention to the details of a learning task to gestalt-type acquisition and manipulation of content and structure. The use of contextual clues may be thought of as being somewhere between the two poles: after all, the use of context requires both a global view of the entire linguistic

structure and possibly the pragmatic background as well as an effort to isolate individual details within the larger context. Cognitive Flexibility then is a metafactor superordinate to the others.

Because of this conceptual overlap, it is clear that certain learning strategies should also load either on both Factors 4 and 5 (Context and Global Approach), viz. 12 and 27; or on Factors 4 and 2 (Context and Task Detail), viz. Strategies 16, 19, 22, 24, 28, 31 and 32, as can be seen from the factor loadings (see Table 4 in the Appendix).

The factor structure is otherwise quite clear and simple. Factor 1, involving the Reading Strategies, contains only one item of dubious association with Reading (having to have prior knowledge of the content of a recorded passage in order to facilitate recognition of individual sentence elements). In Factor 2, all learning strategies may be assigned unequivocally to Attention to Task Detail. The Writing Factor contains dictionary-use in the language laboratory, which may be thought of as involving writing. The use of Contextual Clues (Factor 4) is also quite clear after the above considerations of conceptual overlap have been accepted. In Factor 5, the Global Approach learning strategies, Strategy 10 (concentrating more on getting the answer right than on being original) is difficult to reconcile with the other strategies in this factor; the rather diffuse factor loadings are probably also due to the unsatisfactory clarity of the verbal description (What does it mean to be "original" when practising in the language laboratory?), and the two alternatives may not have been perceived as offering a real either-or choice.

Factor 6 is, as has been pointed out above, by far the weakest because it consists, with one exception, of items previously assigned to other factors. Because the concept of Cognitive Flexibility does play a significant role in the literature the factor is retained in this form here for exploratory purposes, but further research, possibly with more clearly defined items which would allow the expression of such a concept, is needed for verification.

2.2.5 Factor Scores

On the basis of the factor solution obtained, scales can be built which represent the theoretical dimensions associated with the respective factors. These factor scores for individual data

cases are calculated from the factor-score coefficient matrix by multiplying the factor score coefficients by the standardized values of the n variables (e.g., variable value V_1 minus mean of variable V_1 divided by the standard deviation of Variable V_1) and summing over all variables. In this manner, each variable's contribution to the factor (as measured by the factor coefficient), and therefore its importance, is taken into consideration.

Factor scores, being standardized scores, have a mean of zero and a standard deviation of 1.0. Because all six factors will have been brought to the same common denominator in terms of their distribution, values on the various factor scales can be compared directly. The sign displayed by the factor score indicates either above-mean raw scores (+) or below-mean raw scores (-). Thus, if a variable had a raw score mean of 1.80, a value of 1.43 would indicate strong agreement, a value of 2.99 would indicate disagreement. If 1.80 is converted to the standardized mean of .00, the factor score equivalent of 1.43 would have a negative sign, 1.99 a positive sign.

2.2.6 Differences in the Actual vs. Hypothetical Evaluations of Strategies

It will be remembered that students were also asked to evaluate those strategies which they had not really used while studying in the language laboratory, but to indicate the fact that the evaluation was only hypothetical in nature. It was therefore important to determine whether there was any consistency in the differences of evaluation, if any, of the various items depending on whether a particular learning strategy had actually been used by students or not.

A t-test between uncorrelated means revealed a number of such differences as Table 6 in the Appendix shows. As the number of students in some of these cases was quite low (ranging from a low of 5 to a high of 60 out of 455 students), an arbitrary limit of 10% of the total student population was chosen who had to respond "hypothetically" with significant differences, in comparison with their peers who had actually used such strategies, for the item to be included among those "truly" significantly different.

It was observed that in every such case a strategy was involved which had to do with reading the text. This observation corresponded to reality as in one of the courses no written materials were available at all which could have been used by students in their work in the language laboratory. It was interesting to note that in each case the students evaluated the reading strategies significantly more positively than did the students who had actually used these reading strategies. An analysis of variance comparing the Actual and Hypothetical evaluations in that particular course and all other courses taken together provided empirical evidence that any difference could be mainly attributed to that one course. No such assignment to specific courses was possible with the other items.

Because the number of learning strategies in which the Actual and the Hypothetical evaluations differed significantly from one another was, first of all, relatively small; because the number of students involved in each case was small; and because the differences were consistent and explainable, the researchers felt justified in combining the Actual and Hypothetical evaluations into one total.

2.2.7 Effect of Size of the Relatively Larger Group of Students in the Second-Year French Course

An analysis of learning strategies by individual course showed that there were very few systematic and consistent differences among the various courses. Of particular interest was the fact that the Second-Year French course (N = 190) was not more often significantly different from the other courses than it was (Reading Factor: comparison between this course and the Advanced Language and Literature course at the University of Victoria). One had to be aware of the possibility that in a cumulation of responses from all courses, this particular group — because of its size — could have a significant distorting effect on the average and could therefore produce an atypical pattern of distribution of the learning strategies. This apprehension was not justified, however.

3. LEARNER STRATEGIES AND SELECTED STUDENT VARIABLES

The manner in which students deal with the material that is presented to them in the language laboratory is likely to be conditioned by a number of factors, among which academic ability, type of linguistic training or orientation, duration and type of exposure to the foreign language and degree of motivation for its study can be expected to play a major role. In order to help second language teachers develop adequate language laboratory programs, a knowledge of which strategies are used by which categories of students appears necessary.

3.1 General Selection of Strategies

The student population as a whole rejected the *Writing Strategies* (unweighted group mean of 2.95 on a scale from 1 to 5) as not being effective or used frequently in a laboratory situation. On the other hand, they evaluated the *Reading Strategies* and *Cognitive Flexibility* as being somewhat frequent and useful (2.38 and 2.37, respectively) along with the *Use of Contextual Clues* (2.14), and considered the *Global Approach to Understanding* (2.06) and *Attention to Specific Features of the Learning Task* (2.05) as particularly efficient and frequently used.

Name	Factor
Attention to Specific Features of the Learning Task	2.05
Global Approach to Understanding	2.06
Use of Contextual Clues	2.14
Cognitive Flexibility	2.37
Reading	2.38
Writing	2.95

3.2 Relationships Between Learning Strategies and Student Variables

3.2.1 Formal vs. Functional Language Background

The choice of learning strategies was clearly related to the ways in which students had acquired their second language. Not surprisingly, those who had learned it mostly by living in the country where it is spoken generally rejected the Reading strategies, but favored Cognitive Flexibility. In particular, they tended to concentrate more on the quickness and smoothness of their response than on its formal accuracy and correctness, and they tried to take in the overall meaning of a message without picking out key words (see Table 7).

Conversely, students who had learned their second language in courses valued Cognitive Flexibility less highly than those of their peers who had acquired it in the country where it is spoken. They tried to anticipate what would come next and favored self-monitoring (in particular, they found it more helpful to record an exercise on tape and to listen to it many times and make changes as they went along), and made more extensive use of Contextual Clues (e.g., they were more likely to listen to critical features in oral questions and to identify individual elements of the message before putting them together in their own minds).

The different strategies used by these two categories of students undoubtedly reflect the way in which they acquired their second language. It is understandable that students who learned it in a formal setting — the classroom — will be more likely to resort to reading and to formal strategies (such as Krashen's (1976) "monitoring" in its various forms), thus reflecting the mode of presentation of the material, the conditions of practice (with no limitations on the number of attempts allowed), and the requirements of the academic goal (production of correct utterances to satisfy the requirements of

TABLE 7
Formal and Informal Language Background and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
Course	377	-.036	.892	4.560	p. <.05
Home	23	.274	1.072		
Country	30	.420	.898		
Factor 2: Attention to Task Features					
Course	377	-.007	.811	.262	
Home	23	-.019	1.079		
Country	30	.105	.754		
Factor 3: Writing					
Course	377	.004	.866	.772	
Home	23	-.153	.775		
Country	30	.138	.578		
Factor 4: Use of Contextual Clues					
Course	377	-.004	.794	1.187	
Home	23	-.242	.742		
Country	30	.085	.929		
Factor 5: Global Approach to Understanding					
Course	377	-.031	.741	1.262	
Home	23	.228	.594		
Country	30	-.009	1.050		
Factor 6: Cognitive Flexibility					
Course	377	.035	.756	4.101	p <.05
Home	23	-.064	.576		
Country	30	-.367	.777		

tests, quizzes and examinations). On the other hand, for students who acquire a second language in the country where it is spoken, the need for communication is the paramount and all-pervasive parameter, which explains their preference for communicative or "functional" practice, leading to fluent use of the language in question, without focussing on the mastery of its rules or its underlying structure.

In addition, it may be the case that a number of students who have acquired a second language in the country where it is spoken have — because of the favorable conditions of their linguistic experience, and depending, of course, on the length of exposure — reached a level of fluency which makes it unnecessary for them to focus consciously on the form of their utterances and to engage in constant monitoring; instead, it allows them to concentrate on the fluency of their responses and the content of the messages which they produce. Their less functionally experienced — and often more insecure — counterparts, however, find it necessary to pay constant attention to form.

One unexpected result was that students who had learned their second language mostly at home resembled more closely the course students in their use of learning strategies than those who had learned it in the country where it is spoken. The explanation could lie in the degree of motivation (or the effect of motivation on the selection of strategies, see 5.2.7) and linguistic insecurity of the home-learners. Quite commonly, second-generation immigrants struggle to retain their native language by speaking it at home and, because they are isolated, they may make a deliberate effort to keep it free from anglicisms, which requires constant attention to form. Moreover, as numerous immigrants are conscious of speaking a "dialect" — and this feeling is reinforced by their exposure to the standard variety presented to them in language courses — they endeavor to rid their speech of "incorrect" lexical and grammatical structures, therefore focussing on the form of the message.

3.2.2 Influence of Previously Experienced Teaching Methodologies

Students who had always been given descriptions of grammatical and pronunciation difficulties before or after they worked on them in the classroom or in the laboratory were more likely to pay attention to the critical features of a learning task and to monitor their production carefully in recorded assignments when compared to those who had never been given such instruction (see Table 8). They, in turn, rejected the Global Approach in comparison to those students who claimed to have received such explanations only rarely. Students who had "always" been given these explanations said quite strongly that they listened for critical features, recorded their assignments and made corrections. Clearly, students' learning strategies are patterned by prior training; this result gives confirmation to the expectation that learning strategies can, in fact, be taught.

TABLE 8
Formal and Informal Language Background and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
Not Applicable	106	.021	.870	.159	
Always	69	.010	1.102		
Usually	144	.024	.880		
Seldom	89	.032	.827		
Never	35	-.103	.942		
Factor 2: Attention to Task Features					
Not Applicable	106	.173	.807	2.382	<.05
Always	69	-.204	.762		
Usually	144	-.024	.797		
Seldom	89	-.015	.778		
Never	35	.075	1.074		
Factor 3: Writing					
Not Applicable	106	-.044	.772	.235	
Always	69	.019	.782		
Usually	144	.033	.838		
Seldom	89	-.025	.945		
Never	35	.103	.854		
Factor 4: Use of Contextual Clues					
Not Applicable	106	.098	.866	1.214	
Always	69	-.068	.903		
Usually	144	-.090	.752		
Seldom	89	.049	.752		
Never	35	-.124	.727		
Factor 5: Global Approach to Understanding					
Not Applicable	106	.147	.810	2.364	<.05
Always	69	-.085	.744		
Usually	144	.031	.779		
Seldom	89	-.158	.635		
Never	35	-.082	.761		
Factor 6: Cognitive Flexibility					
Not Applicable	106	.010	.688	.128	
Always	69	.025	.778		
Usually	144	-.018	.792		
Seldom	89	-.027	.780		
Never	35	.060	.625		

3.2.3 Number of Years of Training in a Second Language

It had been expected that the number of years spent in learning a second language at high school or university would differentiate significantly among the six major patterns of learning strategies. Although this was not the case (see Tables 9, 10, 11, 12), a correlation was found to exist between this factor and a number of individual strategies.[1] In particular, students who had studied the second language longer tried to be more aware of which grammatical constructions gave them greatest trouble in order to give them special attention while listening and practising. They checked words which they did not understand on the tape before listening again. While they first listened to an entire paragraph or story without being concerned with every detail, they found it more useful to think of key words around which to build an oral response and were more likely to use the dictionary than their less experienced counterparts. On the other hand, students with less second-language training were less likely to use the context to determine the meaning of a word, to read along in the text in order to understand it better or to connect the sound with the printed word, but were more likely to concentrate on the grammar principle involved while doing grammar drills in the laboratory. Clearly, these strategies are drawn from a number of different cognitive skill areas.

It appears, then, that students who have had more experience in second-language learning have a more active attitude (selection of features, use of contextual clues, note-taking), display more initiative and use an approach which could be characterized as "problem solving", yet fairly flexible. There may be a number of reasons for this state of affairs, and it is quite likely that rather than being viewed as separate and alternative hypotheses, they should be considered as largely overlapping and cumulative (see 5.7 for a discussion of a proposed model of the use of learning strategies at various levels of instruction).

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[1] The analysis of students' responses assigned to individual cells for each year of background for a first foreign language in high school (uncollapsed frequency distribution) revealed no significant differences among the various groups considered. It was then decided to collapse individual cells and to contrast "no background" vs. 3 years, vs. 6 years, vs. 9 years of background (to reflect major divisions in the high school curriculum), or no background vs. any background. None of these analyses showed systematic differences in the perceived usefulness of the learning strategies.

TABLE 9
Years of a First Foreign Language in High School and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
None or not given	70	-.310	.737	2.40	
1 year	22	.245	.974		
2 years	28	-.108	1.011		
3 years	96	.038	.828		
4 years	38	-.036	.898		
5 years	60	-.172	.958		
6 years	51	.254	.849		
7 years	25	-.010	.960		
8 years	22	.316	.937		
9 or more	43	.200	1.021		
Factor 2: Attention to Task Features					
None or not given	70	.075	.878	1.177	
1 year	22	.141	.960		
2 years	28	-.134	.780		
3 years	96	.119	.831		
4 years	38	-.092	.825		
5 years	60	.021	.773		
6 years	51	-.092	.833		
7 years	25	-.326	.582		
8 years	22	.110	.709		
9 or more	43	-.151	.847		
Factor 3: Writing					
None or not given	70	.001	.919	.112	
1 year	22	.036	.945		
2 years	28	.075	.750		
3 years	96	.042	.988		
4 years	38	-.051	1.426		
5 years	60	.049	.572		
6 years	51	.282	1.307		
7 years	25	-.253	1.190		
8 years	22	-.173	.721		
9 or more	43	-.241	.351		

It is possible that the observed relationship between strategies and years of study reflects the development of general learning strategies which rest more extensively on active participation by the students as they progress through their school and university careers.[2]

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[2] The fact that second-language students cannot give up strategies which they use constantly in dealing with other subject matters has been observed in other studies. After reporting that all students whose learning behavior was observed "said they regularly used graphic support with four emphasizing that they actually wrote down the new material whenever possible", Wesche (1979) adds: "The course methodology seeks to make beginning students independent of reading and writing, but this is conceivably an impossibility for literate adults who have spent from twelve to twenty years in school learning through this medium" (p. 423).

TABLE 9. (continued)

Factor	N	Mean	S.D.	F.	Probability
Factor 4: Use of Contextual Clues					
None or not given	70	.146	.923	1.987	
1 year	22	.152	.614		
2 years	28	-.186	.844		
3 years	96	.131	.742		
4 years	38	-.128	.837		
5 years	60	-.122	.840		
6 years	51	-.232	.787		
7 years	25	-.212	.663		
8 years	22	-.034	.658		
9 or more	43	.183	.808		
Factor 5: Global Approach to Understanding					
None or not given	70	.293	.852	2.075	
1 year	22	.165	.745		
2 years	28	-.120	.739		
3 years	96	-.040	.690		
4 years	38	-.189	.686		
5 years	60	-.083	.766		
6 years	51	-.173	.679		
7 years	25	.054	.911		
8 years	22	.087	.722		
9 or more	43	.082	.808		
Factor 6: Cognitive Flexibility					
None or not given	70	.229	.854	2.097	
1 year	22	.167	.687		
2 years	28	.084	.582		
3 years	96	.039	.753		
4 years	38	-.102	.574		
5 years	60	-.212	.634		
6 years	51	-.206	.691		
7 years	25	-.052	.895		
8 years	22	-.014	.753		
9 or more	43	.115	.859		

In particular, the fact that significant differences in the use of various strategies frequently involved comparisons between students with less than half a year of training and those who had at least one would indicate a certain threshold effect in the acquisition of learning strategies. It could also be that, through more exposure to linguistic material, students detect patterns of regularity and eventually seek them out, that they become capable of identifying problems and of developing ways of dealing with them (while at the same time drawing on the general learning strategies which they use to handle other aspects of their academic life). This process is no doubt facilitated by the fact that not only are the students presented

TABLE 10

Years of Study of a Second Foreign Language in High School and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
0 years	374	.001	.919	.112	
1 year	23	.036	.945		
2 years	26	.075	.750		
3 or more	32	-.042	.988		
Factor 2: Attention to Task Features					
0 years	374	-.017	.838	.831	
1 year	23	.106	.815		
2 years	26	-.111	.645		
3 or more	32	.111	.901		
Factor 3: Writing					
0 years	374	-.036	.850	1.149	
1 year	23	.097	.812		
2 years	26	.282	.634		
3 or more	32	.057	.858		
Factor 4: Use of Contextual Clues					
0 years	374	-.007	.791	1.249	
1 year	23	-.190	.997		
2 years	26	-.001	.625		
3 or more	32	.252	1.032		
Factor 5: Global Approach to Understanding					
0 years	374	.031	.783	1.033	
1 year	23	-.191	.747		
2 years	26	-.062	.688		
3 or more	32	.074	.594		
Factor 6: Cognitive Flexibility					
0 years	374	.034	.762	.856	
1 year	23	-.152	.641		
2 years	26	-.162	.722		
3 or more	32	-.281	.749		

with more material, but also with more complex material, which at the same time triggers and renders necessary a systematic approach, characterized by association-making and viewing of the language of study as a rule-governed entity.

Beginners, on the other hand, have (comparatively) little material to handle and may not realize the need for the more active and more systematic techniques of their elders. At the same time, the restricted scope of the linguistic material available to them does not allow them to engage in the same kind of association-making, hypothesis-building or inferencing.

TABLE 11

Years of a First Foreign Language at the University and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
0 years	88	.062	.808	.994	
1 year	267	.046	.974		
2 years	77	-.104	.793		
3 or more	23	-.337	.808		
Factor 2: Attention to Task Features					
0 years	88	-.058	.778	2.418	
1 year	267	.012	.811		
2 years	77	.132	.889		
3 or more	23	-.354	.574		
Factor 3: Writing					
0 years	88	-.101	.843	1.747	
1 year	267	.075	.802		
2 years	77	-.031	.927		
3 or more	23	-.500	.812		
Factor 4: Use of Contextual Clues					
0 years	88	.093	.745	1.341	
1 year	267	-.002	.811		
2 years	77	-.022	.869		
3 or more	23	-.509	.646		
Factor 5: Global Approach to Understanding					
0 years	88	.096	.819	1.011	
1 year	267	.009	.738		
2 years	77	-.039	.807		
3 or more	23	-.246	.704		
Factor 6: Cognitive Flexibility					
0 years	88	.084	.570	1.355	
1 year	267	.004	.771		
2 years	77	-.119	.748		
3 or more	23	-.041	.962		

When they encounter difficulties, their limited knowledge of the second language which they are studying does not allow them to look for help within that second language (e.g., by using contextual clues or referring to general patterns), and they may resort to translation strategies. Seen in this light it is not surprising that within the group investigated, students with the least experience, and particularly those with no second-language training in high school, rejected less strongly than the others the idea of formulating an answer to an oral question in their own language before responding to it in the target language. These students also claimed to be much more conscious of "grammar" while practising than their more experienced colleagues.

TABLE 12

Years of a Second Foreign Language at the University and Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
0 years	384	.050	.928	2.44	
1 year	53	-.237	.746		
2 or more	18	-.187	.746		
Factor 2: Attention to Task Features					
0 years	384	.023	.830	1.734	
1 year	53	-.162	.738		
2 or more	18	.050	.789		
Factor 3: Writing					
0 years	384	.001	.845	.505	
1 year	53	-.061	.768		
2 or more	18	.240	.718		
Factor 4: Use of Contextual Clues					
0 years	384	.026	.805	1.694	
1 year	53	-.165	.802		
2 or more	18	-.033	.757		
Factor 5: Global Approach to Understanding					
0 years	384	.019	.789	.633	
1 year	53	-.032	.619		
2 or more	18	-.247	.642		
Factor 6: Cognitive Flexibility					
0 years	384	-.003	.736	.177	
1 year	53	.054	.781		
2 or more	18	.030	1.048		

The generally held belief that knowledge of one language facilitates acquisition of another (which presumably is due to the fact that the student would already know how to go about studying for it) is therefore not borne out by this study. Witness also the fact that there was little interaction between claimed fluency in a third or fourth language and the use of laboratory learning strategies (see Table 13), except that students who said that they were fluent in more languages tended to evaluate more positively the use of learning strategies involving Attention to Task Features. This does suggest that extensive contact with languages other than one's own may help the development of more active and systematic strategies. It is quite possible that such students make conscious use of their acquired knowledge to tackle new information by focussing their attention on areas which they expect to be of importance.

TABLE 13
Fluency in a Third or Fourth Language and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	t	Degrees of Freedom	Probability
Factor 1: Reading						
yes	56	.066	.934	.58	453	
no	399	-.009	.901			
Factor 2: Attention to Task Features						
yes	56	-.178	.748	-1.73	453	
no	399	.025	.830			
Factor 3: Writing						
yes	56	-.059	.870	-.57	453	
no	399	.086	.828			
Factor 4: Use of Contextual Clues						
yes	56	-.078	.768	-.78	453	
no	399	.011	.811			
Factor 5: Global Approach to Understanding						
yes	56	-.123	.796	1.28	453	
no	399	-.017	.763			
Factor 6: Cognitive Flexibility						
yes	56	-.061	.781	.65	453	
no	399	.009	.744			

3.2.4 English Mark and Patterns of Language Laboratory Learning Strategies

The English marks of 407 students were available to the investigators. Four groups of achievement were formed: students with below-average and average achievement (nine-point marks 2 through 6); students with good achievement (nine-point mark 7); students with very good achievement (nine-point mark 8); and students with excellent marks in English (nine-point mark 9) (Table 14).

Compared to students who had excellent or very good marks in their last English course, average or poor achievers found the Use of Contextual Clues, the Global Approach and Cognitive Flexibility significantly less frequent and useful in their language laboratory practice sessions. The strategies used by the superior students reflected a certain sensitivity to the entire context of a sentence as well as a willingness to work on whole utterances rather than on individual elements in piecemeal fashion; and more importantly even, the excellent students

TABLE 14
English Mark and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
av & below	39	-.230	.944	2.38	
good	112	.182	1.014		
very good	159	-.042	.870		
excellent	97	.012	.859		
Factor 2: Attention to Task Features					
av & below	39	-.035	.820	.735	
good	112	.061	.884		
very good	159	-.012	.787		
excellent	97	-.110	.842		
Factor 3: Writing					
av & below	39	-.006	.901	1.302	
good	112	.067	.852		
very good	159	-.079	.813		
excellent	97	.122	.886		
Factor 4: Use of Contextual Clues					
av & below	39	.223	.732	2.62	.051
good	112	.038	.756		
very good	159	-.015	.744		
excellent	97	-.168	.887		
Factor 5: Global Approach to Understanding					
av & below	39	.386	.814	4.298	.005
good	112	-.016	.716		
very good	159	-.070	.707		
excellent	97	-.090	.831		
Factor 6: Cognitive Flexibility					
av & below	39	.371	.881	3.980	.008
good	112	-.072	.832		
very good	159	-.043	.652		
excellent	97	-.058	.685		

displayed cognitive flexibility which apparently allowed them to choose among the available strategies those which they thought would suit the task best.

For example, they used the context to determine the meaning of words; they took in overall meaning and compared their grammar and pronunciation with that of the model, and they also rejected the idea of first formulating an answer in their mother tongue before responding.

It seems clear that students who may be thought to have well-developed verbal skills have well-defined strategies of dealing with utterances in a gestalt-type of approach which are also of use to them in the study of another language; what is more, they seem to be aware of which strategies are of most benefit to them and they change them where necessary.

3.2.5 Math-Science Mark and Patterns of Language Laboratory Learning Strategies

In only one group of learning strategies (viz. the Writing Strategies) could significant differences be found among students with various marks in their most recent Mathematics or Science course: students with superior marks rejected the idea of writing things down while or before practising much more vigorously than did students with lower marks, especially those who had average or below-average marks in Mathematics or Science (see Table 15).

Students with average or lower marks said they needed some prior knowledge of the content of a recorded passage in order to recognize individual sentence elements; they also rejected less strongly than their peers the statement that they did not "think" while doing laboratory exercises. The same students also rejected less strongly the idea of writing out the answers before giving an oral response to oral questions. On the other hand, in comparison with superior students, they felt they had to practise words in a phrase or sentence because they didn't remember isolated words that well; and they rejected less strongly the concept of using a dictionary while working in the laboratory.

In a sense, the results obtained for the discriminating effects of the Math-Science mark are disappointing. It had been expected that — in keeping with the results of other research in this area — some significant differences would be obtained with regard to attention given to the features of the learning task, but this expectation was not borne out. The concept of cognitive flexibility was very close to displaying inter-group differences: for the better students the strategies involved in this concept were much more frequent and useful than for the average and poor students.

One can get the impression that low achievers in Math or Science are more cautious in their approach and rely more extensively on support techniques; they are also less resourceful and flexible in their approach than the superior students. Although the Writing Strategies are rejected as such by all groups, the excellent Math-Science students reject them even more strongly than do the other groups, and clearly writing while doing oral practice would be a support technique to be

TABLE 15
Math/Science Mark and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
av & below	42	-.143	.986	.914	
good	95	.123	.866		
very good	128	-.014	.959		
excellent	137	.014	.858		
Factor 2: Attention to Task Features					
av & below	42	.085	.825	.412	
good	95	.024	.909		
very good	128	-.040	.878		
excellent	137	-.053	.693		
Factor 3: Writing					
av & below	42	-.207	.945	4.481	p<.05
good	95	-.117	.816		p<.05
very good	128	-.022	.802		p<.05
excellent	137	.216	.851		
Factor 4: Use of Contextual Clues					
av & below	42	-.103	.712	.582	
good	95	.060	.791		
very good	128	-.053	.870		
excellent	137	.001	.714		
Factor 5: Global Approach to Understanding					
av & below	42	.032	.615	.506	
good	95	-.003	.715		
very good	128	-.082	.764		
excellent	137	.023	.822		
Factor 6: Cognitive Flexibility					
av & below	42	.111	.815	2.050	
good	95	-.056	.779		
very good	128	-.123	.677		
excellent	137	.070	.726		

resorted to only in those instances where working within the language system and determining meaning from context is not possible.

This observation is in keeping with the previous statement that students with less exposure to and less knowledge of the second language favored a less global approach and made more use of such support techniques as reading, writing and translating than those who have achieved a better command of the language in question. It seems that the lower a student's general competence the more likely he is to prefer a more piecemeal, less integrated approach and to use various support techniques.

TABLE 16
Competence in Playing a Musical Instrument or in Singing and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	t	Degrees of freedom	Probability
Factor 1: Reading						
yes	233	.043	.898			
no	222	-.045	.912	1.04	453	
Factor 2: Attention to Task Features						
yes	233	-.112	.784	-3.00	453	.003 **
no	222	.117	.846			
Factor 3: Writing						
yes	233	-.005	.801	-.13	453	
no	222	.005	.867			
Factor 4: Use of Contextual Clues						
yes	233	-.115	.738	-3.14	453	.002 **
no	222	.120	.856			
Factor 5: Global Approach to Understanding						
yes	233	-.017	.726	-.46	453	
no	222	.018	.810			
Factor 6: Cognitive Flexibility						
yes	233	-.080	.763	-2.36	453	.019 **
no	222	.084	.725			

3.2.6 Competence in Playing a Musical Instrument

Competence in playing a musical instrument or in singing seems to be correlated in a statistically significant manner with a number of learning strategies (Table 16). In particular, students who claimed such competence appeared to pay critical attention to the features of the learning task more frequently than students with no musical background; they rated more positively the use of contextual clues, and they displayed greater cognitive flexibility.

It is reasonable to assume that music students (or those who have acquired musical skill), who must show great dedication to and concentration in their task in order to become competent in playing a musical instrument, transfer their working habits to other areas of study; hence their positive evaluation of Attention to Task Features and their frequent use of Contextual Clues.

This interpretation is further confirmed by the results obtained for individual strategies. Students with a music background favored repeating aloud the confirming master in a four-phase drill, or repeating sentences to establish a grammar pattern in their minds. They claimed that they concentrated on the grammar principle while doing grammar drills in the laboratory, that they listened for critical features, used the context to get at the meaning of a word and tried to be aware of which grammatical constructions gave them the greatest trouble so that they could give special attention to them while practising.

3.2.7 Motivational Variables and Learning Strategies

Degree and type of motivation for studying a second language proved to be important factors in the selection of learning strategies. Four separate questions were included in the questionnaire, each aiming at establishing a different type of motivation. One merely sought to determine whether the students were eager to learn the foreign language ("How strong is your desire to learn the foreign language?"), without enquiring about the reasons for their motivation (henceforth "general motivation"). The other three questions established whether students were studying the second language because it might help them get ahead in their career later on ("career motivation"), because they wanted to speak, think and behave like the people in the other country ("integrative motivation"), or mainly in order to be able to enjoy the achievements of the other culture ("intellectual/aesthetic motivation").

In general, those students who expressed only average desire to learn the second language preferred a global approach and perceived critical attention to detail to be a less useful and frequent complex of learning strategies than did those students who had a strong or very strong desire to acquire the new language. The latter considered as most effective and most frequently used the Attention to Task Features strategies (see Tables 17, 18, 19 and 20).

TABLE 17
Desire to Study a Second Language and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D	F	Probability
Factor 1: Reading					
not very &					
average	80	-.110	.906	.538	
strong	176	.014	.884		
very strong	179	.051	.933		
Factor 2: Attention to Task Features					
not very &					
average	80	.329	.834	6.035	p < .10
strong	176	.010	.689		p < .10
very strong	179	-.149	.904		
Factor 3: Writing					
not very &					
average	80	.148	.891	2.248	
strong	176	.043	.784		
very strong	179	-.093	.870		
Factor 4: Use of Contextual Clues					
not very &					
average	80	.062	.802	1.868	
strong	176	.065	.726		
very strong	179	-.115	.845		
Factor 5: Global Approach to Understanding					
not very &					
average	80	-.076	.686	4.538	
strong	176	-.104	.731		p < .10
very strong	179	.130	.804		
Factor 6: Cognitive Flexibility					
not very &					
average	80	.040	.973	.239	
strong	176	.030	.790		
very strong	179	-.029	.723		

In particular, they differed from their less motivated peers in that they tried to be aware of which sounds and grammatical constructions gave them trouble in order to be able to pay attention to them while practising; they established grammar patterns in their minds by repetition of phrases and sentences; they concentrated on the grammar principle involved while doing grammar drills in the laboratory; they repeated after the model — as many times as necessary — to learn an expression or structure; they paid attention to the words and phrases which people had selected for a given situation. In addition, they favored using contextual clues and stated that they wrote down key words or words which gave them trouble when they listened

TABLE 18
Career Motivation and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading				3.157	
no	168	.021	.936		
yes	193	.066	.892		p<.10
very much so	59	-.271	.889		
Factor 2: Attention to Task Features				.947	
no	168	.056	.805		
yes	193	-.061	.817		
very much so	59	.016	.848		
Factor 3: Writing				1.525	
no	168	.088	.829		
yes	193	-.064	.827		
very much so	59	.047	.909		
Factor 4: Use of Contextual Clues				2.332	
no	168	.009	.826		
yes	193	.021	.771		
very much so	59	-.223	.714		
Factor 5: Global Approach to Understanding				2.845	
no	168	-.102	.803		p<.10
yes	193	.071	.724		
very much so	59	-.113	.704		
Factor 6: Cognitive Flexibility				.503	
no	168	.020	.713		
yes	193	.012	.726		
very much so	59	-.088	.837		

to new material. All these strategies can be viewed as "conscious"[1] strategies, and it is understandable that students who have a strong desire to learn the language make use of all the learning devices which they resort to when dealing with other disciplines. They take an active part in the learning process and endeavor to understand the nature of the system they intend to master and the types of difficulties they are faced with. On the other hand, motivated students rejected the strategy of first formulating the answer to an oral question in their native language before responding to it in the target language, thus joining the ranks of the good achievers and those with a certain level of competence in the second language.

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[1] The term is used by Bialystok (1979) who states: "It is those language learners who are particularly motivated to master the language who engage in conscious strategies" (p. 292).

TABLE 19
Integrative Motivation and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D	F	Probability
Factor 1: Reading					
no	41	-.142	1.118	.860	
yes	289	.036	.932		
very much so	94	-.050	.747		
Factor 2: Attention to Task Features					
no	41	.374	.692	6.763	p<.10
yes	289	-.000	.819		p<.10
very much so	94	-.178	.789		
Factor 3: Writing					
no	41	.190	.910	1.663	
yes	289	.013	.850		
very much so	94	-.094	.778		
Factor 4: Use of Contextual Clues					
no	41	.195	.880	5.260	p<.10
yes	289	.015	.758		p<.10
very much so	94	-.230	.795		
Factor 5: Global Approach to Understanding					
no	41	-.165	.784	1.882	
yes	289	-.034	.758		
very much so	94	.095	.738		
Factor 6: Cognitive Flexibility					
no	41	-.198	.742	1.947	
yes	289	.047	.739		
very much so	94	-.003	.774		

The groups of strategies involving Attention to Task Features and Use of Contextual Clues were also characteristic of students who claimed very strong integrative or intellectual/aesthetic motivation. Those students who said that they were not strongly motivated by intellectual or aesthetic reasons resembled those who only displayed average or less general interest in that they evaluated the global approach as very useful and effective. It follows that wanting to know more about the other language and culture for itself is distinguished by a detailed, task-oriented approach while the global approach is apparently appropriate for students with low general or intellectual motivation.

A different pattern altogether emerged for the students who thought very strongly that knowing the new language would help further their careers: they viewed the Reading Strategies as more frequent and more effective than did those students who did not think that knowledge of another language would get them ahead professionally. Students with low career motivation

TABLE 20
Intellectual/Aesthetic Interest and Patterns of Language Laboratory Learning Strategies

Factor	N	Mean	S.D.	F	Probability
Factor 1: Reading					
no	167	.029	.962	2.133	
yes	184	.054	.876		
very much so	67	-.201	.892		
Factor 2: Attention to Task Features					
no	167	.182	.745	7.699	p<.10
yes	184	-.112	.851		p<.10
very much so	67	-.175	.796		
Factor 3: Writing					
no	167	.108	.806	2.380	
yes	184	-.065	.860		
very much so	67	-.095	.850		
Factor 4: Use of Contextual Clues					
no	167	.090	.861	4.039	p<.10
yes	184	-.052	.691		
very much so	67	-.222	.806		
Factor 5: Global Approach to Understanding					
no	167	-.120	.716	3.774	p<.10
yes	184	.097	.757		
very much so	67	-.044	.797		
Factor 6: Cognitive Flexibility					
no	167	-.037	.728	.462	
yes	184	.031	.760		
very much so	67	.046	.815		

also considered the global approach to be more adequate than their more highly motivated colleagues.

Although one should be cautious in interpreting this result, it may be that students who study a second language in order to help their careers are more inclined to pay attention to details and to try to remember them by associating them with their written representation; this preference may well be determined by their goal for the professional world, which is in turn determined by the setting and the conditions in which they are likely to use the language.

3.3 Correlations And Intercorrelations Among The Various Background Variables And Patterns Of Learning Strategies

In order to gain a better perspective on the characteristics of the sample and on latent relationships among the variables (which will later be associated with selected achievement criteria), it is instructive to look at the various correlations and intercorrelations.

Students' background can be grouped into the following categories: English background, Math/Science background, Music background, foreign language background (years of study at school or at university), fluency in a third or fourth language, methodological background (frequency of grammar explanations received), type of motivation (general desire, career motivation, integrative orientation or intellectual and aesthetic interest), compulsoriness of the course, and finally, the language laboratory learning strategies. Where each category consists of more than one variable, intercorrelations among them will be discussed first and their relationships with other categories susbsequently.

A general remark on the interpretation of these data is in order here: a cursory inspection of Table 21 indicates a large number of significant correlation coefficients, but the actual size of the r's is generally small to negligible. Following the rule concerning the explanation of variation in the relationship between the variables (variance explained $= r^2$) it becomes clear immediately that substantial amounts of variation remain unexplained by one-to-one correlations. For example, an r of .343 between Desire to Learn the Foreign Language and the English mark, which is significant beyond the .01 level, yields only $.343^2 = .117649 = 12\%$ explained variance. It needs to be kept in mind that significance of r only refers to it being "significantly different" from zero; we only have assurance that the r observed is greater than zero and more systematically distributed. The low levels which need to be obtained for significance are, of course, only possible because of the large sample size (N=455).

It will be the task of regression analysis in a later section to parcel out the effects, if any, of all these variables on achievement obtained by the students; in this manner, their relative importance vis-à-vis achievement can be assessed.

TABLE 21

Correlations and Intercorrelations among the Various Background Variables and Patterns of Language Laboratory Learning Strategies

Variable	Fluency in other lang	Variable 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 English mark	-.010																			
2 Math or Science mark	-.010	.763**																		
3 Musical competence	.053	.259**	.187**																	
4 1st FL in school	.026	.194**	.253**	.125**																
5 2nd FL in school	.108**	.017	.020	.058	-.002															
6 1st FL in university	.107**	.163**	.117**	.190**	.060	.037														
7 2nd FL in university	.165**	.017	-.009	.133**	.016	.131**	.357**													
8 Compulsoriness of course	.042	.017	.034	.047	.013	.029	.071	.005												
9 Desire to learn FL	.078*	.343**	.288**	.168**	.193	.003	.221**	.143	.185**											
10 Career orientation	.030	.246**	.169**	.188**	.158**	.058	.122**	.082*	.035	.306**										
11 Integrative orientation	.039	.240**	.201**	.105**	.117**	.069	.129**	.177**	.164**	.505**	.327**									
12 Intellectual/aesthetic motivation	.067	.181**	.040	.084*	-.004	.100*	.109**	.120**	.080*	.430**	.201**	.566**								
13 Frequency of grammar explanation	-.053	.162**	.168**	.088*	.161**	.054	.074	.018	.043	.194**	.219**	.210**	.134**							
14 Factor 1 Reading	.044	.032	.036	.045	.138	.010	.102*	.117**	.043	.057	.080*	.008	.059	-.039						
15 Factor 2 Attention to Task Features	.076*	.068	.063	.137**	.088	.045	.047	.072	.006	.137**	.035	.117**	.143**	.061	-.016					
16 Factor 3 Writing	-.022	.057	.112**	.098	.069	.062	.050	.021	.015	.056	.006	.046	.083*	.039	.073	.070				
17 Factor 4 Use of Contextual Clues	-.034	.091*	.028	.142**	.062	.008	.078*	.085*	.031	.092*	.105**	.167**	.153**	.009	.053	.231**	.033			
18 Factor 5 Global Approach to Understanding	.054	.123**	.071	.029	-.077**	.096*	.080*	.049	.006	.052	.051	.044	.014	.067	.015	.018	.112**	.033		
19 Factor 6 Cognitive Flexibility	-.041	.105	.064	.115	.103	.041	.042	.009	.070	-.012	.007	.062	.045	.006	.000	.007	.002	.014		

* p< .05
** p< .01

3.3.1 Student Background Variables

The students' English marks were highly related to their marks in the most recent Mathematics or Science course (the r of .763 was by far the highest in the entire analysis). Clearly, students who participated in the study had obtained about equal achievement in both subjects and were therefore also approximately equally versed in the respective cognitive skills required by these two disparate subjects.

There were also positive relationships (but of much smaller magnitude) between the English mark and Musical Competence and the number of years of study of a first foreign language at school and at university. Furthermore, the English mark was positively associated with the various motivational measures; apparently, high marks in English and high general desire to study the foreign language, high instrumental and integrative orientation as well as intellectual interest go hand in hand. It is not surprising, therefore, that a large amount of overlap was observed in the use of learning strategies exhibited by students with high marks in English and in Math-Science, those with the greater number of years of second-language study and those with competence in playing a musical instrument, since all these categories are associated with a high general achievement drive; apparently they also share a general cognitive skill factor.

The fact that students who participated in the study obtained almost equal results in English and in Math-Science prevented us from establishing whether the cognitive skills associated with the two disciplines had any significant effect on the selection of laboratory learning strategies. Further study of this important question would require a different research design utilizing comparably sized high and low groups for maximal contrast.

Not surprisingly, compulsoriness of the course was totally unrelated to the English and Math-Science marks, musical background, and length of exposure to a foreign language at school or at university. It was also not associated with any of the learning strategies. On the other hand, those students who did not have to take the course in which they completed our

questionnaire had a higher general desire to learn the other language and were also more integratively and intellectually oriented.

3.3.2 Learning Strategies

Among the learning strategies, there was a positive correlation between Attention to Task Features and Use of Context to Determine Meaning. Conceptually, such an interrelation is meaningful.

On the other hand, Writing strategies and Global Approach to Learning were negatively related to each other. Although this relationship is less transparent, it is also defensible: a person who considers Writing important is unlikely to use the global approach which involves much more general, comprehensive taking in of and dealing with information.

The scores for the six factors embodying patterns of language laboratory learning strategies were, with the above two exceptions, not systematically related to each other. This is, of course, desirable as it substantiates the clarity of definition of the factor structure: the various factors do apparently measure different dimensions of learner strategies.

3.4 Conclusion

The fact that learning strategies do not show systematic relationships with the other variables more frequently (except for Factor 4, the Use of Contextual Clues, which occurs in a larger number of contexts and therefore must reflect some general factor underlying the other classifications) indicates that they measure something which is not wholly measured by the other background variables. It is therefore possible that they can contribute unique variance in the prediction of achievement in addition to that generated by background variables. Of course, they may simply be irrelevant or insignificant variables in the determination of learning success.

4. LANGUAGE LABORATORY LEARNING STRATEGIES, BACKGROUND VARIABLES AND ACHIEVEMENT

4.1 Methodology

Three courses at the University of Alberta were evaluated in terms of the way in which achievement parameters from these courses correlated with the six factors or underlying principles shared by students when they study in the language laboratory. In order to assess the importance which learning strategies have for achievement a multiple regression technique was used with the various achievement criteria available from the courses.

Multiple regression is a statistical technique with which the relationship between one criterion or dependent variable and a set of predictor or independent variables can be analyzed. By calculating the correlation coefficient between each predictor and the criterion variable in turn and eliminating the correlation between and among the independent variables, the unique or actual contribution of each independent variable to the prediction of the dependent variable may be computed. This procedure yields an accurate assessment of the importance of each independent variable in relation to the values of the predicted variable.

The predictor variables which were used in this study were:

1. the most recent mark in English and Mathematics/Science;
2. musical background;
3. number of years of study of a first or second foreign language at school and/or university;
4. the extent to which the language course being studied was compulsory or required by a faculty;

5. the frequency with which students had received grammar explanations before practice in a second-language course;

6. four measures of motivation:

   a. general desire to learn the other language;

   b. the instrumental role of the language in the student's future career;

   c. the extent to which students wanted to be like speakers of the other language (integrative motivation);

   d. intellectual/aesthetic interest in the language and its culture;

7. the six learning-strategy factors.

The authors opted for the use of instructor-assessed marks given to students over standardized achievement tests. Although tests standardized for content and/or format would have offered advantages such as reduction or elimination of instructor/examiner biases, comparability of results across courses, greater refinement in test construction and administration methods yielding increased reliability, the most severe drawback would have been the likelihood of insufficient validity. While a standardized test would probably have measured more "objectively" the amount of material learned, organized and retained, the teacher-constructed test yielding teacher grades is more likely to reflect specific learning objectives and therefore the specific learning strategies employed for attaining these objectives. It must be remembered, however, that in reading the results reported below, the "true" relationships between predicting and predicted variables could have been obscured or distorted in the following manner: if no significant differences or no correlations were obtained one could conclude that:

1. there were in fact no true differences or true relationships;

2. the variables selected as predictors were inappropriate;

3. the concepts underlying the predicting and predicted variables were inadequately defined; or

4. the testing instruments selected to measure the predicting and predicted variables were invalid.

Concern about a certain lack of relationships or differences obtained in the area of cognitive strategies has been expressed, for example, by the following authors:

> ". . . An examination of the abilities measured by Pimsleur's Form A Spanish Tests and Form C French Tests revealed that the language skills measured by these tests were often not specific in content or technique to the language objectives being pursued by the students involved in this investigation. This suggests that the concept level/learning environment interaction effect might well have been different if the results were determined according to criterion-referenced testing procedures. This type of test measures performance according to specified language objectives — has the student mastered the objectives of this unit of study? — rather than in relation to his classmates' performance.
>
> It appears that researchers interested in measuring individual or group mastery of instructional objectives under specific learning conditions must consider developing and utilizing measurement devices appropriate for this purpose" (Zampogna, Gentile, Papalia and Silber, 1976, p. 447).
>
> "There did not seem to be any major differences in the cluster of variables that were predictive of success for the two criterion measures. . . . The lack of differences may be attributable to the fact that the tests were not adequately measuring the aspects of linguistic competence they were designed to . . . . [Some] of the teachers indicated to the investigators that they were certain that the students were unfamiliar with several of the vocabulary items contained in the test" (Naiman et al., 1978, p. 66)
>
> "The Writing task, however, was again anomalous. . . . The effect observed . . . was positive, but not sufficiently large to achieve statistical significance. Possibly the Writing task, for which the lowest scores of all the criterion measures were obtained, was too difficult for any of the strategies to be effective in improving performance.
>
> The amount of inferencing reported by students on the questionnaire had almost no effect on achievement. It is possible that the inferencing strategy was reserved for contextual situations in which it is necessary to ascertain only the gist of a difficult utterance. None of the criterion tasks approximated this degree of functionality in that a formal component was always involved. Alternatively, however, it may be that the questionnaire provided an inadequate assessment of inferencing. In this case, no claim may be made about the role of inferencing — it neither

> discriminated among the criterion tasks nor facilitated general performance. To decide between these alternatives, both a better instrument for measuring inferencing and a task placing greater stress on general communicative meaning need to be developed (Bialystok, 1979, p. 392).

4.2 Samples

For statistical reasons relating to minimum sample size, only two courses (total N=141) will be discussed in the relation between predictor variables and achievement. The first course, an intermediate French course, has been divided into two groups: A (N=38) and B (N=77). This division was made on the basis of differing language laboratory activities which each group experienced. Group A was divided into three smaller sections and shared one common instructor for all instructional time; group B was divided into nine sections, all of which were taught by the same instructor. The second sample contains 26 students enrolled in an advanced French course.

4.2.1 Intermediate French Groups A and B

A course calendar description of Intermediate French groups A and B reads as follows:

> This course seeks to improve the student's reading, writing and speaking ability. Half of the time is devoted to oral and written work based on texts and films dealing with the structure of the language. The other half is devoted to literary texts used mainly as a tool to provide a common subject for discussion and written work. There is a compulsory lab hour of study in the language laboratory. All courses are conducted entirely in French.

Instructors in the course taught "lecture" classes three times per week. In these classes, a grammar text was used as basis for review of French language structures. Classroom activities included remedial phonetic activities, formal grammar study, pattern drill exercises, dictée work, and reading work centered around comprehension and discussions of material read. Periodic written compositions were required of students.

For the students of groups A and B in this course, four criterion marks were available. These marks were:

1. *term mark* which included class quizzes, and exercises, as well as three principal written examinations based on classroom activities;
2. *structured written final exam mark*: based on the student's ability to manipulate the structures of the written language and his ability to organize a number of written sentences into a composition;
3. *lab term mark* which was made up of a number of short tests and quizzes based on ability to (a) discriminate and produce French phonemes, (b) to make grammatical manipulations orally, based on oral stimuli, (c) to master orally selected cultural materials from the course text book;
4. *structured final lab exam mark* consisting of short phoneme discrimination and production questions, a ten-minute oral creation organized around some unifying topic, oral grammatical manipulation questions, and in Group B, five questions based on cultural materials.

Scheduled laboratory classes in groups A and B were one hour per week. The *language laboratory activities of Group A* (N=38) students involved work in both console-centered language laboratories and audio-visual rooms containing film projection equipment. The instructor taught communicative skills by means of cultural materials in an audio-visual classroom. Students were required to review the content of all laboratory lessons from *Pont Neuf* beforehand in a practice laboratory. During class time, the content of the cultural segment of each tape was reviewed in a question-answer format.

Approximately one hour out of four was spent in the language laboratory practising grammar drills. These drills, however, were not taken from the taped lessons of *Pont Neuf*, but were the instructor's own inventions based on a perceived need for review of a problem specific to the class. Such classes were usually done according to the following format:

a. the class recorded a 10-15 minute segment from the console containing the master track and did the required repetitions, transformations, etc;

b. each student then listened to his own recording in order to compare student and master track;

c. the instructor listened in to students involved in (b) and offered help with problems;

d. students were encouraged to attempt to correct their errors by re-recording over their first incorrect answers.

Film classes were in the approximate ratio of one hour to every four hours of lab work. The instructor, who at that moment was interested in experimenting with the effects of film as a means of improving spoken communicative skills, conducted these classes in the following way:

a. students were given a script of part of a French film and asked to prepare it before the next film class;

b. prior to viewing, the class worked through difficult vocabulary structures;

c. first viewing and discussion;

d. further viewing of specific segments, sometimes as many as two to three times;

e. a written quiz on the film, usually consisting of translations from recorded film conversation;

f. parts (a) to (e) were not necessarily done all in one class. If interest lagged other work was interspersed with the film work.

Grading in the class was done regularly on the basis of pronunciation difficulties and improvement in the production of the phonemes of the French language. Students were assigned a transcribing-pronunciation exercise which involved the cultural passages from the taped lab exercises of *Pont Neuf*. This exercise required students to write down either in French or in IPA what they heard. This material was used for conversational purposes and sometimes was recorded on tape. Both activities were subject to being graded. The final grades consisted of a short oral exam testing the student's ability to communicate on a given topic in which students were given three extracts from taped cultural materials. The student was required to transcribe, read, and record these extracts.

Laboratory instruction for Group B (N=77) involved activities slightly different from those of group A. The instructor of this group viewed her objectives to be to improve listening comprehension abilities in French, to correct the students' ability to perceive and to produce the phonemes of French on a one-by-one basis, and to develop a feeling for the cultural aspects of French life. Each laboratory tape included a brief five-minute explanation of some feature of French culture. There was no writing of French done during class time. Testing was achieved through two main exams, one in each semester. The content of these exams focussed on the student's ability to produce correctly French phonemes in context, to answer questions based on French culture, and to produce a five-minute oral composition.

A typical lab hour in this class was broken down into three sections:

1. a 10-15 minute "repeat-check" phase which involved a teacher review and help with students' pre-recorded work with the preceding lab lesson. The student arrived in class with a tape of the work from the preceding lab lesson in which repetitions had already been done;
2. a 10-15 minute review of the phonetic material of the current lesson. This review, conducted as a choral repetition without the machine, was often accompanied by some IPA transcriptions done at the blackboard by the teacher;
3. a 10-15 minute period during which students recorded some of the material from the current lab lesson.

4.2.2 Advanced French

The third sample (N=26), Advanced French, had the following calendar description:

> Assumes a general background knowledge of French grammar. It aims at providing more specific knowledge in the fields of semantics and syntax, writing and speaking. Fluency will be attained through progressive and varied approaches.

Of the five hours of class time per week, three hours were spent doing reading, writing and grammar activities. The reading material was a series of journalistic texts which were analyzed and used as the basis for student compositions. Grammar was taught from an "applied" point of view, in that rather than doing a systematic review of grammar, explanations evolved from problems encountered by students in their reading and study of the journalistic texts.

Two hours per week were devoted to lab activities. Students listened to songs and poems and completed exercises writing out what they had heard. In addition, students viewed short video tapes (five to ten minutes in length) and were asked to create résumé paragraphs of the viewed material. Although these two hours were called laboratory activities, they were conducted in an audio-visual classroom which did not have recording equipment. Activities that involved traditional machine-assisted laboratory work were done on an individual basis in this course. For one hour per week, students came to a practice lab where they answered questions from a pre-recorded tape and recorded their responses. They also developed their skills in free oral expression by preparing three-to-five minute recordings. An instructor was not present during this one-hour period.

In this course, eight criterion marks were available. These marks were:

1. *oral exams 1-3 plus final oral exam*, which all had basically the same format:
    a. oral production from two to five minutes, based on a subject either with or without an accompanying visual stimulus;
    b. questions based on a recording of a poem or a song;
2. *written exams 1-3 plus final written exam*, again sharing a common format:
    a. grammatical questions;
    b. texts in which a word was suppressed that students had to recover from the context;
    c. writing compositions.

4.3 Results

4.3.1 Intermediate French Group A

At least 67% of variation in the criterion marks could be accounted for by the twenty predictors for each of the criterion categories (see Table 22).

The best predictor of the *lab term mark* by far was the number of years of study of a second foreign language at school (24%); however, with this group of students this predicting variable is somewhat suspect because of the small number of students involved who claimed to have had a second foreign language at school (viz. five). Motivation did account for another 22% (distributed over General Desire and Integrative Motivation), and the learning strategies added another nine percent. The remaining predictors contributed only about three percent each.

Regarding the *term mark* earned for work in the *course*, it can be noted that the learning strategies accounted for 22% of the variation in this mark, 11% alone for the Writing factor. Previously obtained findings are confirmed inasmuch as rejection of Writing strategies is accompanied by increased achievement; the English mark added 4%; motivation was not a very powerful predictor (4%), and all other predicting variables contributed four percent each or less.

In the *structured final lab exam* (which had consisted of transformations, expansions and the like), the Mathematics /Science mark was by far the best contributor (26%), followed by the learning strategies (13%), and length of study of a second foreign language at school; motivation also added 8%.

For the criterion *final written exam mark*, the artifact of the second foreign language in high school proved to be the best predictor again (22%), followed by the learning strategies (18%, with 11% accounted for by the Writing strategies); the compulsoriness of the course, motivation and the Math mark each contributed another six percent to an explanation of the variation in the criterion mark.

TABLE 22

Intermediate French Group A: Summary Table of the Variation in the Criterion Marks Explained by the Twenty Predictors (in percent)

Criterion	Lab		Course	
	Lab Term Mark	Structured Final Lab Exam	Course Term Work	Final Written Exam
Factor 1: Reading	.65	5.03	2.14	1.95
Factor 2: Attention to Task Features	.36	.20	.05	.56
Factor 3: Writing	2.91	.13	10.52	11.29
Factor 4: Use of Contextual Clues	.21	1.93	1.44	.46
Factor 5: Global Approach to Understanding	2.48	2.42	3.90	.02
Factor 6: Cognitive Flexibility	2.35	3.31	3.47	3.35
Learning Strategies: Total	8.96	13.02	21.52	17.63
English	2.03	1.84	3.62	.15
Mathematics/Science	3.02	26.05	1.98	5.16
Musical background	1.97	.31	1.43	2.69
Fluency in other language	1.01	3.16	1.87	.92
Years of study of				
1st FL in school	.66	.06	2.45	2.16
2nd FL in school	23.61	10.10	21.15	21.54
1st FL at university	.26	.38	3.33	.07
2nd FL at university	1.24	.39	.05	1.93
Compulsoriness	1.71	.10	1.89	6.77
Terminology	.53	2.76	2.58	1.03
General Desire	11.71	8.36	.95	1.38
Career Motivation	.55	/	3.15	2.42
Integrative Motivation	7.36	.39	.04	2.91
Intellectual Motivation	2.16	.09	.12	.13
Motivation: Total	21.78	8.84	4.26	6.84
Total	66.77%	67.00%	66.11%	66.89%

4.3.1.1 Discussion

In this course, the best predictors of the various types of achievement were the learning strategies (in particular, the Writing strategies), the Mathematics/Science mark and the number of years spent by the students with a second foreign language at school. The learners evaluated the Writing strategies fairly consistently and apparently used those skills which are associated with the work in Mathematics and the Science.

The other variables played, on the average, only a secondary role. When the twenty predictors are grouped into five sub-groups, the following results are obtained:

	Approximate percentage of the variation in criterion mark explained by the predictor
Cognitive skills and aptitude	14%
Language experience	24%
Learning strategies	15%
Motivation	10%
Course factors	1%
TOTAL	64%

There are a number of systematicities in the prediction of the various marks which merit closer attention:

1. For both term marks, the learning strategies played a significant role; this result is intuitively meaningful because the students, over the academic year, would likely have developed — by themselves or following the instructor's advice — a certain style of work. It was interesting to see that these strategies — especially the Writing strategies — also predicted marks in the lecture class segment (course term work and course final written exam), and actually even somewhat more effectively than for the lab marks themselves. It had been expected that the learning strategies would be better predictors of the term mark because they would have been developed over an entire year in a variety of situations, while achievement on a one-shot exam need not necessarily be indicative of true achievement; this expectation was borne out by the course data, but not by the lab data. The relatively low contribution of the learning strategies to an explanation in the variation of the lab term mark can be ascribed to a number of possible causes (see below). An explanation may have to do with a possible confusion in the student's mind what he was evaluating because of the great variety of activities.

2. The strong predictive power of the Math/Science mark for explanation of the variation in the mark obtained by students on the oral structured exam may reflect the emphasis which the instructor put on the conscious and deliberate manipulation of phonemes and structures.

3. It is fascinating to note that the distribution of variance of course-related marks, which represented or included large measures of written work and on which lab instruction should not have had a direct effect, resembled the distribution observed for the prediction of purely lab-related criteria to a remarkable extent. The hypothesis may be advanced that language laboratory work is just a sub-set of general language learning work and that language laboratory learning strategies are, in turn, just a sub-set of general language learning strategies.

4. While the overall contribution of learning strategies to an explanation of the variation in achievement was satisfactory (viz. indicating a range from about ten to twenty percent of the total variation to be accounted for), inasmuch as they do play a major role in addition to well-recognized predictor variables for success in second-language learning such as verbal and logical skills or motivation, the role of the various factors needs to be looked at more closely:

The Reading Strategies played a very small role; Cognitive Flexibility, in this course, also played a minor role, and the Global Approach, the Use of Context, and Attention to Task Features also made only small or negligible contributions to an explanation of the criterion variance. The Writing Strategies, however, especially for the course work, did offer a strong element of prediction: it must be noted that they were rejected overall by the students in the course (as well as by other students), but it was the pattern of their rejection which was the determining factor: the stronger their rejection, the better the mark. Clearly, this course encouraged students to do without writing, and those students who were able to liberate themselves from the need to write, obtained higher marks than those who were unable to do so.

One would have expected other learning strategies, such as Attention to Task Features, to play a greater role in the determination of achievement, but such was not the case. It will be seen that such more systematic predictive ability did, in fact, occur with some of the other courses.

4.3.2 Intermediate French Group B

In this course, an average of 51% of the variance in the criterion mark[1] could be accounted for by the six criterion categories (see Table 23). For the *lab term mark*, the learning strategies, and especially Factor 2 involving Attention to Task Features, were the best predictors in contributing about 14% of the variance. With three exceptions, all other variables explained about 5% or less. In this group, it is integrative motivation contributing about 8% of variance, which plays a principal predictive role as opposed to Group A where it was integrative motivation and a general desire to learn the other language. Group B emphasized the role of the first foreign language at university whereas group A had shown a relationship between achievement and experience with a second foreign language in school.

For the *structured final lab exam*, Cognitive Flexibility played a moderately strong role in the prediction process among the various learning strategies, but intellectual/aesthetic motivation was by far the best individual predictor. All other variables contributed less than four percent each for a total of about 44% — there are few similarities in the pattern of prediction between Groups A and B, but it must be remembered that the format and the content of these exams was left up to the two lab instructors. While the Mathematics/Science mark was the best predictor of achievement in the structured final lab exam in Group A, intellectual/ aesthetic motivation assumed the corresponding role in Group B: this difference did reflect comparative emphases in instruction.

For the *final written exam* in the course, the Mathematics /Science mark at 16% and intellectual/aesthetic motivation at 15% are the best predictors, followed by learning strategies with about 12% and compulsoriness of the course at about 5%. Other variables contribute 2% or less to these categories. The *course term mark* shows a somewhat similar pattern with learning strategies contributing 13% and Mathematics/Science 11% of the criterion variance. However, the main predictor is general Motivational Desire at 13%; Intellectual Motivation plays a secondary role at 7%.

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[1] The fact that the amount of variation explained is lower than for Intermediate French Group A is due to the different sample sizes (viz. N = 58 vs. N = 77); the smaller the sample the better the chance for greater explanatory completeness.

TABLE 23
Intermediate French Group B: Summary Table of the Variation in the Criterion Marks Explained by the Twenty Predictors (in percent)

Criterion	Lab		Course	
	Lab Term Mark	Structured Final Lab Exam	Course Term Work	Final Written Exam
Factor 1: Reading	.26	/	4.42	1.76
Factor 2: Attention to Task Features	12.44	.08	2.06	.03
Factor 3: Writing	.24	1.56	2.73	2.12
Factor 4: Use of Contextual Clues	.20	.17	.01	1.93
Factor 5: Global Approach to Understanding	.47	1.99	.13	/
Factor 6: Cognitive Flexibility	.49	5.04	3.29	5.91
Learning Strategies: Total	14.10	8.84	12.66	11.75
English	.11	.31	.53	.30
Mathematics/Science	7.90	3.84	11.42	15.62
Musical background	1.28	3.30	2.45	.60
Fluency in other language	.77	.34	.01	.82
Years of study of				
1st FL in school	1.05	1.17	.14	.54
2nd FL in school	.27	.61	.66	.37
1st FL at university	9.76	2.61	2.77	.24
2nd FL at university	.57	.02	2.91	.29
Compulsoriness	.53	.64	1.23	7.06
Terminology	.66	.19	.51	.21
General Desire	.15	2.84	12.86	1.20
Career Motivation	.64	.74	2.84	.77
Integrative Motivation	8.19	.20	1.82	.24
Intellectual Motivation	1.58	17.87	6.66	15.02
Motivation: Total	10.56	21.65	24.18	17.23
Total	47.54%	43.49%	59.37%	55.02%

4.3.2.1 Discussion

The variables which are the most effective predictors of the four criterion marks in Intermediate French Group B are the learner strategies, the Mathematics/Science mark, the first foreign language at university, compulsoriness of the course, and intellectual/aesthetic motivation. These variables explain about 36% of total variation. Divided by groups, these results are obtained:

	Approximate percentage of the variation in criterion mark explained by the predictor
Learner strategies	12%
Cognitive skills and aptitudes	12%
Motivation	18%
Language experience	10%
Course factors	2%
TOTAL	54%

Several observations are in order again, especially in a comparison of results obtained for Group A of the course.

1. Among the learning strategies, Factor 2 (Attention to details of the learning task) plays a major role in the prediction of the lab term mark, while Factor 3 (Writing Strategies) had assumed the more important role in Group A. The instructor in Group B may have stressed awareness of phonetic details more than the other instructor.

2. The significance of Intellectual/Aesthetic Motivation is explainable by the importance which the instructor of Group B placed on cultural information. Everyday culture was dealt with in the Group A lab classes.

3. The Mathematics/Science mark plays a consistently important role across Groups A and B in structured exams, but, of course, structured language exams are analytical and do involve the same sort of activities as may be required for tasks in Mathematics or Science courses.

4. With the exception of the Math mark, the pattern of prediction for the two structured exam marks in Group B was very similar; the two term marks for the lab and the course differed markedly from each other, however, reflecting the special emphases on phonetic detail and cultural information, respectively.

5. The two groups displayed very similar features with regard to the low significance in the prediction process of the English mark, musical background, fluency in a third or fourth language, and knowledge of grammatical terminology.

6. From the overall point of view, motivation is a far better and consistent predictor in Group B than in Group A; it is interesting that the instructor's special emphases would

have carried over into the student's motivational make-up, evidence of the potential influence of an instructor on a student's learning behavior and general disposition and, furthermore, evidence of the multivariate composition of the achievement criterion.

7. Because of the similarities between the patterns of prediction for the structured final exam in the lab and the final written exam in the course in Group B, from the various items of student background, further credence is lent to the tentative hypothesis that language laboratory learning strategies are only a subset of general language learning strategies.

4.3.3 Advanced French

In this course, between 75% and 95% of the total variance could be accounted for, depending on the criterion mark.

4.3.3.1 Oral Exams (See Table 24)

a. Oral exam I: about 76% of total variance was explainable by the 20 predictor variables. The best predictor was the number of years spent in learning a first foreign language at school (19%); learner strategies added a further 14%, motivation 13%, musical background 10%, the number of years of a first foreign language at the university level 10%. The above five variables accounted for 66% of the total variation of the marks of the 26 students in this first exam.

b. Oral exam II: 90% of variation of student marks could be explained by the 20 predictors. The number of years of a first foreign language at school was the best predictor (25%), learner strategies contributed a further 19%, and motivation 19% for a total of 64% for these variables.

c. Oral exam III: 92% of the variance was attributable to the 20 variables used in the multiple regression equation. The first foreign language in school accounted for 27%, motivation 26%, the second foreign language at university 14%, and the learner strategies 8%. The major variables explained about 75% of variation.

d. Final oral exam: 95% of total variance was attributable to the 20 predictors. The most important predictors in order of importance were learner strategies (30%), motivation (24%), number of years of a first foreign language at school (12%) and at university (7%), and musical background (10%). The above predictors totalled 83%, with the others making up the remaining 12%.

TABLE 24

Advanced French: Summary Table of the Variation in the Four Oral Exam Criterion Marks Explained by the Twenty Predictors (in percent)

Criterion	Oral I	Oral II	Oral III	Oral IV
Factor 1: Reading	2.96	4.88	.25	1.12
Factor 2: Attention to Task Features	/	1.49	/	1.95
Factor 3: Writing	9.07	.08	.51	1.16
Factor 4: Use of Contextual Clues	.55	4.76	1.14	2.50
Factor 5: Global Approach to Understanding	.43	1.39	.49	1.96
Factor 6: Cognitive Flexibility	.62	6.41	5.79	20.83
Learning Strategies: Total	13.63	19.01	8.18	29.52
English	/	7.73	.83	5.05
Mathematics/Science	.34	2.57	.77	2.51
Musical background	9.99	3.49	7.92	9.55
Fluency in other language	5.79	3.03	.60	/
Years of study of				
1st FL in school	18.78	24.98	27.40	11.99
2nd FL in school	.99	5.41	1.02	2.52
1st FL at university	9.87	.13	.50	6.51
2nd FL at university	2.26	2.45	13.90	1.41
Compulsoriness	/	/	/	/
Terminology	1.15	3.76	5.10	2.35
General Desire	.20	.08	2.23	.91
Career Motivation	11.39	9.86	22.25	22.09
Integrative Motivation	.76	4.74	1.31	.75
Intellectual Motivation	.59	4.14	.03	.02
Motivation: Total	12.94	18.82	25.82	23.77
Total	75.72%	91.36%	92.03%	95.15%

Discussion

The best and most consistent predictors of achievement on oral exams in the Advanced French course were learner strategies, motivation, years of study of a first foreign language at school and university, and students' musical background. Divided by groups, the following amounts of variation in the criterion marks are accounted for:

	Approximate percentage of the variation in criterion mark explained by the predictor
Language experience	35%
Motivation	20%
Learning strategies	18%
Cognitive skills and aptitude	16%
TOTAL	89%

These observations can be made about results obtained for the Advanced French group (oral exams):

1. The learner strategies played a major role in the prediction of oral exam marks, especially the final oral examination. Among them, Cognitive Flexibility played a prominent role — again in the final oral examination. It was interesting to see that the Cognitive Flexibility factor gained from practically zero at the beginning of the year to about one third of the variation in the mark which needed to be explained. On the other hand, the Writing Strategies dropped very significantly from the beginning of the year to the end.

2. Among the motivational factors, career motivation was the most important variable — which is meaningful because almost all students were Education students and intended to become teachers of French; integrative or intellectual/aesthetic motivation which had played a larger role in the Intermediate course was practically negligible as a predictor.

3. While English again played a rather insignificant role as a predictor as it had in the Intermediate course, it was interesting to see that Mathematics contributed so little here, but of course, the exam involved more global fluency than detailed accuracy of expression.

4. The variable "Years of study of a first (second) foreign language at school or university" occupied a prominent place in the prediction of success on oral exams in the Advanced French group. At first, one might be tempted to evaluate this variable as a proficiency factor (length of exposure to French which would have been the first foreign language at school and at university, which would probably lead to higher achievement in this course), but on one exam

the second foreign language accounted for almost 14% of the variation in the criterion; in the absence of alternative explanations, however, the first explanation appears to be meaningful enough to reject the anomaly as an artifact.

5. The relatively strong showing of musical background as predictor is due to the fact that the learning activities in this course encompassed working with songs and poems; in particular, students sang, transcribed and summarized songs.

4.3.3.2 Written Exams (See Table 25)

The following results were obtained in Advanced French:

a. First written exam: the predictors could explain about 90% of the total variation. The best predictors were the learner strategies (32%), followed by motivation (21%) and the Mathematics/Science mark (7%). Musical background, English, and the various criteria regarding years of study of a foreign language contributed about 5% each.

b. Second written exam: 77% of variation was accounted for by the predictors. Learner strategies explained 22%, the Mathematics/Science mark accounted for 15%, and the remaining explained variance was distributed approximately evenly over the remaining predictors at about 5% for each one.

c. Third written exam: in this exam, learner strategies explained about 25% of variance, motivation 15%, the Mathematics/Science mark about 12%, and the number of years of a first foreign language at the university a further 10%.

d. Final written exam: the motivation variables explained 22% of the variance, the Mathematics/Science mark and learner strategies about 15% each.

TABLE 25

Advanced French: Summary Table of Variation in the Four Written Exam Marks Explained by the Twenty Predictors (in percent)

Criterion	Mid-Term 1 Written Exam	Mid-Session Written Exam	Mid-Term 2 Written Exam	Final Written Exam
Factor 1: Reading	5.93	7.06	3.44	3.13
Factor 2: Attention to Task Features	.86	/	2.72	.79
Factor 3: Writing	6.68	2.25	3.82	.74
Factor 4: Use of Contextual Clues	9.26	7.60	1.09	3.37
Factor 5: Global Approach to Understanding	5.79	4.78	7.48	6.53
Factor 6: Cognitive Flexibility	3.69	/	6.25	.18
Learning Strategies: Total	32.21	21.69	24.80	14.74
English	4.84	5.75	2.32	1.68
Mathematics/Science	6.59	14.68	12.06	15.05
Musical background	5.25	7.57	5.53	4.37
Fluency in other language	.13	4.51	.45	7.60
Years of study of 1st FL in school	4.71	1.77	4.21	2.80
2nd FL in school	5.28	1.01	3.70	/
1st FL at university	1.97	5.69	9.33	1.78
2nd FL at university	4.18	6.14	.38	.79
Compulsoriness	/	4.30	/	/
Terminology	3.88	/	3.51	1.28
General Desire	1.68	/	.89	3.04
Career Motivation	.11	.55	/	7.18
Integrative Motivation	2.15	3.72	7.26	3.95
Intellectual Motivation	16.86	.06	6.37	7.68
Motivation: Total	20.80	4.33	14.52	21.85
Total	89.82%	77.43%	80.79%	71.92%

Discussion

In the case of written exams, the language laboratory learning strategies, motivation, and the Mathematics/Science mark were the best, most consistent predictors of explainable variance. The approximate averages of total variation explained in the exam marks were:

	Approximate percentage of the variation in criterion mark explained by the predictor
Cognitive skills and aptitudes	24%
Learning strategies	24%
Language experience	17%
Motivation	15%
Course factors	1%
TOTAL	81%

As observed before in the Intermediate French Groups A and B, the Mathematics mark was also a strong predictor of success in written exams in Advanced French, while English did not play a major role in the prediction process.

The Learning Strategies consistently represented an extremely strong predictor, accounting for between 15 and 32% of the total variation in the achievement criterion; it would be difficult to state, however, which of the six groups of learning strategies played the most important role; the Global Approach to Understanding and the Use of Context to determine meaning certainly did occur consistently with about five percent on all four examinations, however. The fact that Attention to Task Detail played a rather insignificant role is likely due to the fact that the course encouraged students to work with paraphrases, alternate ways of expression and the use of context; they were, after all, at a level of proficiency at which they did not need to pay as much attention to the basics of the language as a beginning or intermediate student would have to.

Although the effect of length of study of the foreign language at school or university is far from clear, it does appear that length of exposure at university (one, two or three years) and the resultant differences in levels of proficiency had a discriminating effect on achievement on written exams; it will be remembered that length of exposure going back to high school had a strong predictive effect for oral proficiency.

As the examinations always contained a cultural component, it is clear that integrative and/or intellectual motivation should play a major role in determining achievement. Yet the rather small involvement of career motivation was somewhat unexpected when one compares it with its role in the prediction of oral achievement. It may be possible that non-native speakers of French as future teachers considered oral proficiency to be much more important for success in modern second-language teaching (thus making strength of this predictor a much more effectively discriminating variable) than written proficiency.

5. SUMMARY AND CONCLUSIONS

A. *Summary*

This study has attempted to relate students' achievement in French in a classroom setting to various predictors known to be of significance in the determination of achievement, and to parcel out, in particular, the effect which students' learning strategies might have had on their success in learning French at the Intermediate and Advanced levels. Although the empirical evidence is on occasion not unequivocal, a number of important conclusions can be drawn from the results.

5.1 General Trends

There are *general trends* in prediction, which apply to all experimental settings, and *specific phenomena*, which are the result of specific methodologies or instructor preferences.

When the average total variance in the prediction of achievement accounted for by the various independent variables is brought to a common denominator (see Table 26), it becomes clear that, among the five groups of background variables, *course factors* play an insignificant role. *Motivation* is responsible for about one fifth of the overall variation, but there are sharp discrepancies between the two groups in the Intermediate course, which are likely due to differing instructor emphases. *Learning strategies* account rather consistently for one fifth of the total variation in all courses, ranging between twenty and thirty percent; the same is also true for *cognitive skills and aptitudes*, while *language experience* ranges from about twenty to forty percent. Yet there is sufficient inter-group variation to make a general statement about relationships and balances rather imprecise except for the generalization that, comparing percentages across groups, the four groups of predictors appear to contribute about one quarter each to an explanation of the variation in the criterion marks, with certain significant exceptions.

This finding gives, on the one hand, some insight into dominant processes, yet also draws attention to the fact that the prediction process is an extremely complex one and that many variables (such as instructor preferences), which are very difficult to quantify, may affect the equation. It is clear therefore that in view of these variations no short-cut to

TABLE 26
Comparison of Variation in the Criterion Marks Accounted for by the Five Groups of Predictor Variables

	Intermediate French				Advanced French			
	Group A (N=38)		Group B (N=77)		Oral (N=26)		Written (N=26)	
	A	B	A	B	A	B	A	B
Cognitive Skills	14%	(22%)	12%	(22%)	16%	(18%)	24%	(30%)
Language Experience	24%	(38%)	10%	(19%)	35%	(39%)	17%	(21%)
Learning Strategies	15%	(22%)	12%	(22%)	18%	(20%)	24%	(30%)
Course Factors	1%	(2%)	2%	(4%)	0%	(0%)	1%	(1%)
Motivation	10%	(16%)	18%	(33%)	20%	(23%)	15%	(19%)
Total	64%	(100%)	54%	(100%)	89%	(100%)	81%	(100%)

A - Actual
B - Adjusted

prediction can be taken and that all the variables used here may appear in different configurations as determined by the instructional situation.

In spite of these cautions, it is now an established fact that learning strategies must be taken into account in any effort at prediction of achievement because they play at least as important a role as do other well-known variables such as motivation and the various cognitive skills and aptitudes. Furthermore, if language experience as measured here by the criterion of years of exposure to a second language in school or at university and the degree of fluency in a third or fourth foreign language are, in fact, tapping a proficiency factor (which would have to be cross-validated with an objective proficiency measure) it is evident that length of study of another language determines a student's rate of success in the acquisition of that language.

5.2 General Versus Course-Specific Trends

These can be summarized as follows:

5.2.1 The English Mark

The English mark, which taps the student's level of general verbal skills, was a weak predictor for all courses, except for Advanced French where essays had, in fact, to be written. This differential effect is meaningful, of course, in view of the skills likely to be required for success on of highly structured language examinations in the phonology and the morphology of a second language.

5.2.2 The Mathematics/Science Mark

Conversely, the Mathematics/Science mark was a moderate to very good predictor of success in structured examinations of the students' ability to perceive and produce sounds as well as grammatical structures. It was interesting to see this variable appear also as the strongest predictor of success on the structured laboratory exam in Intermediate French Group A.

5.2.3 The Role of Musical Background

The role of musical background can be assigned a very minor position; it did not appear as an even moderately strong predictor, except in the Advanced French course — and that has to do with the fact that students in that course had to work with songs and poems as part of their learning activities; if such had not been the case, skill in singing or playing a musical instrument would not have had any substantial relationship to achievement at all.

5.2.4 Exposure to Grammatical Explanations

The extent to which students had been exposed to grammatical explanations before or after practice in class or in the language laboratory did not display a strong relationship

with achievement in any of the courses; knowledge of the terminology thus appeared to be relatively independent of and non-discriminating among levels of achievement. It is likely that course instructors had either no need for such terminology or taught it themselves in their own university French class so that all students must have had approximately the same level of knowledge.

5.2.5 Years of Study of a First or Second Foreign Language

The criterion "Years of study of a first or second foreign language at school or at university" was unexpectedly useful as a predictor, and was an intriguing one at that.

The number of years which students had spent in learning a first foreign language at school was a weak predictor of success in the oral lab exam in the Intermediate course, but played no role whatsoever in the written exams or term marks of the same course; in the Advanced French course, length of study of a first foreign language in high school proved to be an excellent, if not the best, predictor of oral proficiency and a weak predictor of written proficiency. Clearly, length of study is related to the level of achievement here, and students with longer backgrounds in French evidently had an advantage over their peers who had less background. This was especially true for the Advanced French course.

The number of years spent in learning a second foreign language at school was a weak or insignificant predictor in all courses except for Group A of the French Intermediate course; however, because of the small number of students involved, we are probably dealing with a data artifact.

The number of years of a first foreign language at the university proved to be a weak to moderately strong predictor of success, especially with the term mark (sustained effort) in the Intermediate course and with written and oral work in the Advanced French course.

Length of study of a second foreign language at university was, in most cases, a very weak predictor; the isolated occurrences of a higher rate of explanation of criterion variance are unsystematic and therefore probably artifacts.

One may conclude that length of exposure to a second language is, in general, a good, well-discriminating predictor of success (especially for oral proficiency), and particularly so on advanced levels of learning.[1]

5.2.6 Fluency in a Third or Fourth Language

Fluency in a third or fourth language was only a weak or insignificant predictor of success in all courses. It does occur several times in the prediction of the term mark, but it is also involved in the determination of achievement on a single examination. At any rate, it does appear to add measurably to an assessment of a general proficiency evidenced by Years of Study of a Foreign Language at School or University.

These results indicate that there is no clear additive effect of simple knowledge of a third or fourth language on achievement in a second language as measured in the classroom setting, and one may conclude tentatively that depth and breadth of proficiency in one second language may well be more indicative of success in that language than is knowledge of a different foreign language. Obviously, this suggestion is intriguing and requires further study, in particular, as it concerns the relationship between success in one foreign language and (i) global proficiency in another foreign language as it might have been acquired in a natural context without formal practice or (ii) proficiency as a result of structured learning efforts. In the latter case, one might expect beneficial transfer effects at least in the area of learning strategies if not in the task of acquiring linguistic competencies.

The present data are likely to support the second assumption because students indicating knowledge of a third or fourth language had probably learned this language in their home rather than at school or university, but this is only a conjecture, of course.

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[1] Naiman et al. (1978, p. 17) claim that "length of exposure appear[s] to be less significant for success in language learning than a strong motivation and positive attitude towards the learning task, favorable learning circumstances (e.g., immersion into the target language environment), certain personality characteristics, such as sociability and persistence, and the development of learning techniques suitable to the learner's personal needs." However, in their study, language competence was established on the basis of self-evaluations and, as pointed out by the authors (*loc. cit.*), one must question the reliability of such a procedure.

5.2.7 Motivation

Motivation as a predicting variable appeared to be extremely sensitive to differences among courses, both in the types of motivation which functioned as predictors and the extent to which they helped explain the criterion variance.

In the Intermediate French Group A, motivation played a major significant role only in the prediction of the mark on lab term work: a general desire to learn the other language and integrative motivation as the two main motivating forces make intuitive sense for that type of examination. But for all the other criteria in that course, the various motivational dimensions were useless as predictors. With regard to motivation, an examination of the means and especially the standard deviations for the three courses (which could have indicated lack of spread and therefore reduced discriminability) did not yield any substantial differences between this course and the other two.

In the other Intermediate French course (Group B), the instructor's preferences for cultural activities are clearly reflected in the importance which integrative motivation and intellectual/aesthetic motivation were accorded in the prediction process.

Career motivation played no role whatsoever in both Intermediate groups — which means that students did not expect, in a systematic manner, to get a better job by having done an Intermediate French course; all students had either similarly high or low professional expectations so that this variable could not discriminate among their achievement levels. Career motivation did, however, play a very strong role for the Advanced French students — many of whom expected to become teachers of French — but only for oral proficiency. For written proficiency, intellectual/aesthetic motivation was a good predictor at the beginning of the year, less so later on.

These results point out quite clearly the need to distinguish among the various kinds of motivational perceptions which a student may hold in response to course and instructor variables. It is not enough to say that students "need to be motivated"; one must specify the objective, the purpose, the course content and instructor expectations.

5.2.8 Language Laboratory Learning Strategies

The language laboratory learning strategies have been well established as significant predictors of success in all courses; their contribution to an explanation of criterion variance ranges from low (lab term mark in Group A, for which the many different activities could have been confusing) through moderate (some criterion examinations in Intermediate Group B) to very strong (term work in Group A course and oral final and written exams in the Advanced French course).

The Reading Strategies are, on the whole, consistently insignificant predictors of success in the Intermediate French course and are weak to moderate in the Advanced French course. This result may have to do with the course levels investigated; it is quite possible that the findings could have been considerably different in a beginners' course where reading as a preparatory or supporting learning strategy might well be more attractive to the students. Evidence for this assertion is the fact that Intermediate French students evaluated the Reading strategies as far more negative than did the beginning students (a factor score of .347, which indicates a rejection of these strategies, compared to factor scores of -.503, -.854, -.651 and -.484, which indicates strong acceptance by beginning courses in German, Japanese, Chinese and French, respectively). Unfortunately, no grades were available for one or more of these courses; the samples would also have been too small for statistical purposes.

The Writing Strategies also played a very insignificant role in discriminating among levels of achievement and predicting success, too, except in the Group A Intermediate French course where they served as very strong negative predictors. One may conclude that the better students had less need for written support strategies while the poorer students felt that they had to use the writing strategies in language laboratory work.

Attention to Task Detail had been expected to play a much greater role in the prediction of achievement. Although the correlations between acceptance of this factor and achievement in the various groups are all significant and positive (indicating that an increase in attention to task detail is accompanied by an increase in achievement) there likely was insufficient discrimination among achievement levels to allow a greater contribution to an explanation of the variation in the criterion.

The Use of Contextual Clues served as a very weak predictor of achievement in the Intermediate course; in the Advanced course it was a moderately strong to strong positive predictor, especially for written achievement assessment. One may infer that this learning strategy is sensitive to course objectives and proficiency levels because its use would have been much more readily possible (and was in fact encouraged) in the Advanced level course than in the Intermediate course.

The Global Approach was again a very weak discriminator among achievement levels in the Intermediate course, while its role was more pronounced in the Advanced course, especially for the written examination criteria; although the Advanced students expressed greater preference for the global approach itself (Factor scores of -.282 vs. -.061 for Intermediate students) and the correlations were small, they tended to be negative with achievement, indicating a decline in achievement with increasing preference for the global approach.

Cognitive Flexibility played a moderately strong to strong role in the Advanced French course, but a weak to insignificant role in the two Intermediate groups. It may be that the latter course did not require this learning set as much as the higher-level courses because of the limitations on the materials imposed by the student's restricted proficiency.

These results show that learning strategies should always be looked at in a group because they may appear in so many different configurations of importance; a search for *the* single successful individual learning strategy for all occasions is therefore misguided.

Yet, the learning strategies in this study do not contribute as much and as unequivocally to the explanation of variation in the criteria as one would wish.

The poor showing of learning strategies especially in the prediction of the lab term mark (see Table 22) of Group A of the Intermediate French group needs some explanation. It may well be that in view of the large numbers of different kinds of activities in the laboratory and the AV-room, the students did not know on which activity to concentrate while evaluating the items composing the questionnaire; consequently, any trends would have been obscured by the divergent evaluations of what was supposed to be evaluated.

Of course, it could be true that learning strategies are, in fact, not related systematically to achievement. This negative assertion is, however, not acceptable because they do distinguish systematically between good and poor learners (See 5.3 below). Thus two other explanations involving methodology are offered instead: it had been noted above that the student sample included only an insufficiently large number of below-average and failing students so that their perceptions of the usefulness and efficacy of learning strategies are not well represented; or it is quite likely that, for example, students tended to pay attention to task detail (or said that they did) because they had probably been told repeatedly to do so by their instructor. The authors believe the first explanation to be more applicable because Table 3 in the Appendix shows that each learning strategy did elicit a sufficient spread of evaluations from strong agreement to strong disagreement to allow for high potential discriminability of the item.

Consequently, the effect of the learning strategies on achievement as measured here is likely to be underestimated; future research should, using a sample with greater spread in achievement, clarify and confirm or modify our findings.

5.3 Use Of Learning Strategies Distinguishing Good From Poor Learners

An analysis was performed of the manner in which the extreme group on either end of the achievement scale in each student sample (e.g., poor versus very good and excellent students) evaluated the frequency and usefulness of the learning strategies (see Table 27); this procedure eliminates the potentially distracting and confounding influence of the middle group.

In comparison with below-average and poor students, successful students rejected the Reading and the Writing Strategies and the Global Approach, but accepted as useful and frequent Attention to Task Detail, Use of Contextual Cues and Cognitive Flexibility. There is sufficient replicative evidence across groups to confirm the general trends.

Individual strategies (Table 28) differentiating the two achievement groups are drawn mostly from the Reading, Use of Context and Attention to Task Features Factors. For the *Reading Strategies*, agreement across courses was not very great

TABLE 27

Use of Strategies by Below-Average and Superior Students (Factor Pattern)[1]

	Intermediate French					
	Group A			Group B		
	Lab Term Mark	Final Lab Exam	Course Term Mark	Lab Term Mark	Final Lab Exam	Course Term Work
Reading	-.4313 .3396					
Attention to Task Detail						1.0943 -.3885
Writing		.0516 .6229	.0201 .7373			
Use of Contextual Clues						1.0611 .1629
Global Approach					-.0405 .4149	
Cognitive Flexibility		.2549 -.3605			.2500 -.4923	

	Advanced French							
	Oral Work				Written Work			
	Oral 1	Oral 2	Oral 3	Oral Final	Mid-Term1	Mid-Session	Mid-Term2	Final
Reading								
Attention to Task Detail		.4761 -.0277						.6552 -.0270
Writing						-.8547 .2387		
Use of Contextual Clues							.2048 -.6041	
Global Approach								
Cognitive Flexibility						.1371 -.5720	1.1557 -.2322	

[1]Factor scores: the smaller of the two values (top=unsuccessful students; bottom=superior students) indicates higher preference for the group of learning strategies. Only those values are given where the difference between them is significant beyond the .05 level of probability.

because of the differing use of materials in the various courses. Poor students in the Advanced French course, for example, rejected very strongly the idea of reading along in the lab or of keeping the book open while practising so that they could look at instructions if necessary. In both the Intermediate French course B and the Advanced French course, below-average students said that they had to have some prior knowledge of the

TABLE 28

Use of Strategies by Below-Average vs. Superior Students

Learning Strategy	Intermediate French A		Intermediate French B	
	Final Lab Mark	Lab Term-Mark	Lab Mid-Term	Structured Lab Exam
N (below average)	14	13	21	4
(superior)	12	13	17	18
3	3.07			
	1.83			
4	2.57			2.00
	3.42			3.22
8			2.76	
			2.06	
12			3.10	3.75
			2.41	2.56
13		3.00		
		4.00		
15	2.29			4.50
	3.33			3.28
18		2.16	2.67	
		3.15	3.47	
19			2.43	
			3.29	
20				3.00
				1.67
24		3.31	3.00	
		2.39	2.24	
29		2.08		2.50
		1.54		1.44
30			3.38	
			4.18	
31				3.00
				1.67
33				1.50
				2.94
37		1.92		
		2.54		

content of a recorded passage to be able to understand individual sentence elements; in the Intermediate French A course, poor students were more strongly in favor of reading along in the book to connect sounds with the written word; in the French B and the Advanced course this idea was very strongly rejected by these students while superior students remained neutral.

Less equivocally, superior students evaluated the *Use of Contextual Cues* as having been more frequent and useful than had been the case for the below-average students; they practised new words in the context of a phrase or sentence, paid attention to the way other people used them, and they attempted to associate new words with actual situations. Poor students said

TABLE 28 (continued)

	Advanced French					
Learning Strategy	Oral I	Oral II	Oral III	Oral Final	Written 1	Written 2
N (below average)	12	7	4	5	5	4
(superior)	10	16	11	12	13	15
2			1.25 2.27			
4				2.40 3.33		
10					1.25 2.00	
14						1.50 3.47
15		4.43 2.44		4.40 2.50		
23						1.00 2.00
26			4.50 3.18	4.80 3.08	4.20 2.77	
30					4.60 3.58	
33		2.00 2.75				
36		4.86 3.00		4.80 3.00		
37			1.00 2.00			

Note: All differences significant at or beyond the .05 level of probability

they committed new material to memory by saying it out loud; they identified individual elements first and then put them together in their minds.

Furthermore, superior students rejected the idea of translation before responding, of studying carefully all texts before working in the lab, but they concentrated on the grammar principle and repeated aloud the confirming response in a four-phase drill.

5.4 Sustained Effort Versus Short-Term Assessment

Where these data are available (Intermediate Groups A and B), it is illuminating to contrast the predictive power of the background variables for marks reflecting a sustained or a short-term, one-shot effort. The only variables which can be

found to distinguish (with reservations for the lab mark in Group A : see 4.3.1) between these two types of achievement criteria are the learning strategies; they are good to excellent predictors of term marks and moderate to good predictors of one-time exam marks. It is likely that marks cumulated over a period of time reflect more effectively persistent and consistent effort as exhibited by a development of learning strategies.

5.5 Written Versus Oral Achievement Criteria

Several parameters were available for a comparison between achievement on written and on oral exams:

Intermediate French Group A:	Structured final lab exam Final written exam
Intermediate French Group B:	Structured final lab exam Final written exam
Advanced French:	Final oral Exam Final written exam

In Group A, the marks obtained in the course were predicted more accurately by learning strategies in general, especially the term work; the Mathematics mark served as a better predictor of the oral exam mark as well as a general desire to learn the other language. For written achievement (if the artifact of the years of a second language at school is ignored), the learning strategies, especially Writing, play the major role.

In Group B, the Mathematics/Science mark and compulsoriness of the course were much better predictors of the final written exam mark than of the oral parameters of achievement.

In the Advanced French course, the Mathematics/Science mark and Intellectual/Aesthetic motivation predicted written achievement better, while for oral proficiency the corresponding variables were musical background, years of study of a first foreign language at school and at university, as well as career motivation.

The picture which emerges from this discussion is that of oral proficiency being determined by extended exposure to the foreign language, a general desire to learn the other language and a wish to become like the speaker of the other language or by the need to acquire the other language for career reasons. On the other hand, variables instrumental in the prediction of

success in written achievement were logical-analytical skills, intellectual/aesthetic motivation, and the question whether or not the course was compulsory for the students.

The fact that the learning strategies appeared as predictors of equal value for success in both written and oral work lends further credence to the argument raised above (see 4.3.1.1) that the language laboratory strategies isolated here are, in fact, only a specialized subset of general language learning strategies. An inspection of the 38 items will reveal that most are independent of laboratory machinery or the laboratory learning context: they can be employed both in a naturalistic, informal learning situation as well as the formal classroom context.

B. *Conclusions and Recommendations*

This study has confirmed, as have others before (see, in particular, Naiman et al., 1978), that learning strategies constitute only *one* of the factors which contribute to successful language learning, but it did establish that their role is an important one since it was found that they generally accounted for about 20% of the observed variation in levels of achievement. Based as it was on the systematic inclusion of other factors such as motivation, general aptitude and number of years of study of a second language, and on the weighting of these various factors by means of a multiple regression analysis, this result must be viewed as a reliable indication of the place which a good understanding of learning strategies should occupy in research on second-language learning and teaching.

5.6 Language Laboratory Learning Strategies As A Subset Of General Second Language Learning Strategies

As had been anticipated, several aspects of this study (see in particular 4.3.2.1) suggest that language laboratory learning strategies do not differ from general second-language learning strategies. The results of the present study must therefore be evaluated not only with reference to established practice in language laboratory teaching/learning, but also against the background provided by the body of research accumulated in the broader domain of second-language teaching in general.

An important result of this study is the isolation of the factor labeled "Cognitive Flexibility" as one of those which were associated with success. It is clear that this factor does not constitute a strategy, but rather a learning style, whose chief characteristic is a general ability to switch to the most

appropriate strategy, depending on the conditions of learning. This confirms Stern's (1975) contention that "good learners can often adapt to almost any learning condition." Because of their cognitive flexibility, they will do well, no matter what approach is used by their teacher(s). On the other hand, less gifted students — those who lack this cognitive flexibility — are "hard-hit by the methods of teaching which are not appropriate for [them]" (p. 311) and will have to be given enough latitude so that they are not hampered by rigid approaches not suited to their characteristics or their needs; they will also need to be taught strategies which have been convincingly correlated with success in second-language learning. [3]

5.6.1 Cognitive Strategies and the Professional Literature

In this study, two cognitive strategies were significantly associated with success: Attention to Task Features and Use of Contextual Clues. This result confirms the findings of Naiman et al. (1978), whose subjects (or at least 94% of them) viewed language learning as highly conscious and systematic (p. 11), and adds significance to their observation that "the two subjects who regarded language learning as a totally unconscious process were the unsuccessful learners." (Naiman et al., loc. cit.).[4] It is also in keeping with their view that good language learners "monitor the language they are acquiring by testing their inferences (guesses); by looking for needed adjustments as they learn new material", a strategy which, following Krashen (1976), they label "MONITORING OF L2 PERFORMANCE" (Naiman et al., 1978, p. 15). At the same time these findings confirm the intuitions of other scholars such as Rubin and Stern. For Rubin, the good language learner is "prepared to attend to form. [He] is constantly looking for patterns in the language. He attends to the form in a particular way, constantly analyzing, categorizing, synthesizing" (Rubin, 1975, p. 47). In addition, he is "a willing and accurate guesser" and "uses all the clues which the setting offers him" (Rubin, 1975, p. 45). For Stern (1975, p. 313), "the good language learner constantly probes the language

[2] Naiman's caution in interpreting this fact was due to the size and characteristics of the sample and to the fact that self-evaluations were the only basis for establishing achievement levels.

and forms hypotheses about it in order to discover rules and relationships and to organize the discrete elements into an ordered whole or system."

Such a conscious approach to second-language learning is in direct conflict with the basic tenets of the audiolingual school. Brooks (1966, p. 138), for example, advocates "the learning of structure through the practice of patterns of sound, order, and form, rather than by explanation." Guberina et al. (1965, p. xv) maintain that sentences must never be subjected to grammatical analysis, an operation which they view as useless for the beginner (xix).

On the other hand, the correlation between success and a conscious approach to second-language learning provides support for the theory-derived principles put forth by cognitive psychologists. According to Carroll (1966, p. 105), "in learning a skill, it is often the case that conscious attention to its critical features and understanding of them will facilitate learning." Chastain (1971, p. 135) who follows Ausubel's cognitive theories of learning,[3] considers that "the learner must understand what is to be learned," and he argues that avoiding any discussion of grammar until the structure has been overlearned is time-consuming and frustrating to the students.[4]

The emphasis on conscious attention to features of the learning task during practice should not be interpreted in a one-sided manner, however, whereby the importance of the development of the motor skills (especially for the acquisition of acceptable pronunciation habits and possibly for the development of fluent speech) would be neglected. Unfortunately, the questionnaire did not contain a sufficient number of items which would have properly evaluated the motor-skill dimension of lab practice, but the successful students did state more strongly than the average or poor students that they repeated the confirming response in a four-phase drill aloud; they also said that they repeated after the model and practised it many times if necessary to learn an expression or structure.[5]

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[3] Ausubel (1968, p. 89) writes: "A central task of pedagogy, therefore, is to develop ways of facilitating an active variety of reception learning characterized by an independent and critical approach to the understanding of subject matter."

[4] Brooks (1966, p. 142) claims on the contrary that "analysis is important in its proper sphere, but analogy is used instead through pattern practice to produce a control of language structure without the time and effort required for grammatical explanations."

[5] In the present study, this difference just barely did not reach standard significance levels; results in the pilot study confirmed such a difference in reported activities between successful and less successful students.

The position that both conscious attention to task features and emphasis on motor skill development play a role in the language acquisition process is, of course, congruent with the cognitive code theory of language learning (see 5.7). This concept involves an interplay between the two dimensions, a shift from a cognitive knowledge of the significant distinctive features characterizing the learning task to psychomotor practice with accompanying attention to these features, and back to a conscious, deliberate integration of the learned feature into the behavioral inventory.

5.6.2 Support Strategies and the Professional Literature

The results of the present study also shed some light on the role of "psychomotor learning strategies" or techniques in second-language learning which support the cognitive learning strategies.

As pointed out earlier, students generally rejected the Writing Strategies, which they claimed not to have used frequently and which they viewed as inefficient. This result is quite understandable since writing cannot but interfere, and in fact can be very disruptive, with the normal operations one associates with oral work, whether in the lab or in the classroom. The use of Writing Strategies (which generally has no impact on achievement, probably because of its low frequency) was, in fact, significantly correlated with low levels of achievement in the Intermediate French course A. This suggests that students resorting to such strategies were not able to cope with aural material and were attempting to reduce it to a format with which they felt more comfortable.

On the whole, the Reading Strategies were insignificant predictors of success in the courses examined. Contrary to the Writing Strategies, they were however, viewed as somewhat useful, and students claimed they used them fairly frequently. It seems reasonable to assume that the observed difference in the use and evaluation of the Writing and the Reading strategies reflects the fact that the latter offer the support of the printed word without the disruptive characteristics of the former (in the context of oral work).

The use of Writing and Reading Strategies has previously been documented by Wesche (1979, p. 423) who reported that students "said they regularly used graphic support with four [out of 11 students] emphasizing that they actually wrote down the new material whenever possible." Wesche's observations and our own suggest that denying the students access to graphic support may have a negative impact on their learning efficiency. After all, students' ability to deal with purely aural material is generally not developed in everyday life or in other academic areas, and attempting to make beginning students independent of reading and writing "is conceivably an impossibility for literate adults who have spent from twelve to twenty years in school learning through this medium" (Wesche, 1979, p. 423).

Elimination of any form of graphic support is one of the basic tenets of the audiolingual school. Brooks (1966, p. 140) views as fundamentally important "the separation during the early stages of hearing-speaking from reading-writing in order that the former may not be hampered by the latter", and he advocates "the early and continued training of the ear and tongue without recourse to graphic symbol" (p. 138), adding that "reading and writing are introduced some months after hearing and speaking have begun" (p. 49).[6] Stack (1966, p. 148) is also quite emphatic and states that "printed materials are banned from the laboratory except when specifically required by the drill." The authors of *Voix et Images de France* (Guberina et al., 1965, p. vii) warn teachers against the temptation to give the book to their students, and one of the requirements of their method is that "aucun de ces textes ne peut être placé tel quel entre les mains de l'étudiant avant la fin du cours" with the result that "au bout de quelques soixante ou soixante-dix heures de cours, il pourra commencer à lire."[7]

As pointed out above, poor learners, those who lack cognitive flexibility, and particularly those who have difficulty with a purely aural-oral approach, are likely to suffer from such a methodology. Chastain (1971, p. 132) concludes that "reliance

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[6] This rather rigid position is based on the belief that the four language skills (understanding, speaking, reading, and writing) must be presented to the learner in that order — which has become known as the "natural sequence." It is beyond the scope and the goals of this study to examine in detail the merits of such a sequence, and adequate discussions can be found elsewhere (See, in particular, Chastain, 1971). Suffice it to say that the sequence observed for the acquisition of L1 is not necessarily valid for the learning of L2.

[7] For the duration of this first course, the textbook available to the students is a collection of pictures corresponding to slides presented in the class-room. The only printed material consists of the title page, the "avertissement", the table of contents, and the titles of each section.

upon the ear in beginning language work may hinder some students who are more eye-oriented." If one is to take seriously the teachings of cognitive psychology, a larger section of the student population may be affected. As stated by Carroll (1966, p. 105), "the more numerous kinds of association that are made to an item, the better are learning and retention. Again, this principle seems to dictate against the use of systems of language teaching that employ mainly one sensory modality, namely, hearing."

While the seriousness of this handicap is acknowledged by Guberina et al.,[8] the authors maintain that such a procedure is necessary, so that students will not become dependent on spelling, since this would prevent them from developing a good command of the oral language: "les phrases écrites, qui lui [the student] apportent au début une trompeuse sécurité, deviennent très vite des béquilles dont l'élève ne peut plus se séparer, et qui l'empêchent de courir bien plus qu'elles ne le soutiennent" (Guberina et al., 1965, p. vii). The results of our study suggest that such fears are not justified. Thus, it was observed that in the Advanced French course, the amount of variation accounted for by the Writing Strategies dropped very significantly from the beginning to the end of the year (see Table 24). In addition, intermediate students evaluated Reading Strategies as far more negative than beginning students who claimed that they accepted them quite readily. It seems, then, that beginners feel it is necessary to use the support of printed texts to deal adequately with aural material. Students do not appear, however, to have become dependent on graphic support, since, on the contrary, the more advanced among them claimed that they used the Reading (and Writing) Strategies less frequently than their less advanced peers.

A similar pattern was observed for the translation strategy which was preferred by beginners, but rejected by more experienced students. Since only one question dealt with this strategy, our findings must be viewed as tentative. It is clear, however, that the role of translation (or reference to the students' native language) in second-language learning is an important one, as suggested by Hosenfeld (1976) and documented by Naiman et al. (1978, pp. 11-12). Further research should therefore aim to establish under what conditions students "translate" or compare the target with their

[8] "L'absence de texte imprimé plonge maître et élèves dans un cruel désarroi" (Guberina et al., 1965, p. vii).

native tongue, so that the unconditional rejection of the latter may be replaced by a more flexible — while more productive — approach.[9]

5.7 A Model Of The Use Of Learning Strategies Throughout The Acquisition Process

Our results also show that the emphasis which students place on given cognitive strategies changes as they become more experienced and therefore more proficient in the second language which they are learning. In particular, while beginners were more likely to resort to psychomotor support strategies such as reading, translation, and even writing, more advanced students claimed that they paid more attention to the systematic features of the target language, and to contextual clues; they also evaluated a global approach more positively than did beginners. These findings echo those reported by Naiman et al. (1978, p. 14-15). The fact that advanced students are more likely to use a global approach than beginners suggests that familiarity with linguistic material and regular practice leads to a native- (or near-native) like command of the language, i.e., the ability to use it with less conscious attention to the underlying structure, even though the learning approach may have been a conscious and active one (i.e., cognitive). In other words, one should not assume — as do the proponents of the audiolingual approach — that in order to achieve an intuitive mastery of the second language, one cannot learn it through a conscious and systematic process. The gradual passage from conscious learning and practice has been described by Chastain (1969, p. 105):

> They [cognitive proponents] feel that the fact that a habit is an action which can be performed without conscious thought in no way negates a process of conscious, continued application in developing the skill. For example, the fact that a man ties a tie or drives a car without conscious awareness of individual actions in no way signifies that this skill was attained without thinking through each step in the beginning stages of learning. Thus, these

[9] Stern's (1975, p. 316) contention that "the good language learner trains himself to exclude more and more the native language as his reference system and to develop the target language to such an extent that he acquires internal standards of grammaticality and cultural appropriateness" is intuitively sound and should be tested by means of an appropriate longitudional study.

> instructors place primary emphasis on student comprehension of structure. With further practice, the student can perfect his ability to use these same structures unconsciously, leaving his mind free to concentrate on the contents of speech.

In the light of Chastain's observation, it seems at first difficult to understand how advanced learners can, at the same time, favor a more conscious, systematic learning style, and a more global approach than less advanced students. One must remember, however, that until the whole language has been mastered, students deal at the same time with structures with which they are totally familiar, and with new or imperfectly assimilated materials. They can, therefore, deal with "known" material in a global way, while still resorting to analysis, guessing, inferencing and conscious monitoring when faced with new or complex material. Figure 2 illustrates the pattern of use of language laboratory learning strategies over three levels of instruction. While beginners find the Reading Strategies useful and frequent, intermediate students reject them, and advanced students reject them even more strongly. Furthermore, beginners evaluate positively Attention to Features of the Learning Task, but this is less true for intermediate students and even less, in turn, for advanced students. Conversely, advanced students preferred the Use of Contextual Clues, the Global Approach, and the Writing strategies[10] and reported more Cognitive Flexibility than did their intermediate peers; beginners rejected these four sets of lab learning strategies even more strongly than the Intermediates.

In other words, Beginners' learning strategies are composed primarily of narrowly controlling strategies with little use of the more open-ended approaches as exhibited by the Use of Contextual Clues, the Global Approach and Cognitive Flexibility. At higher levels of instruction, a shift in the use of learning strategies has taken place away from those dealing with micro-aspects of the learning task to those strategies which allow an efficient and effective attack on macro-aspects.

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[10] The strong showing of the Writing strategies may well be an artifact because in the one course which makes up the Advanced sample (the Beginning and Intermediate samples were made up of nine and eight different courses each, resp.) students were required to take notes and hand in written assignments based on their work in the language laboratory. Thus this profile characteristic of Advanced students may merely reflect a methodological peculiarity of the course in question.

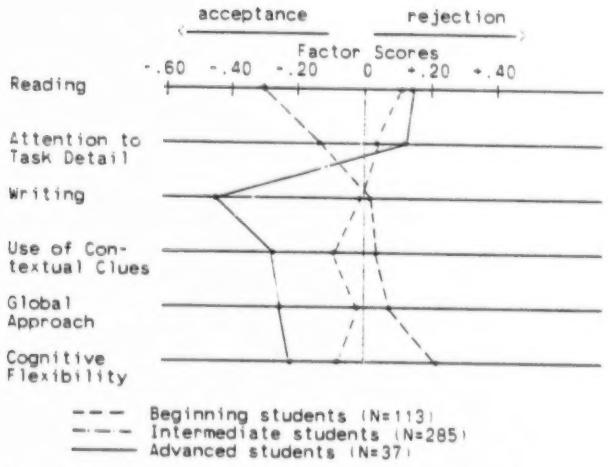

FIGURE 2 Factor Score Profiles for Beginning, Intermediate and Advanced Students

This model of a shift in the usage of learning strategies over levels of instruction corroborates intuitive perceptions of the nature of the learning tasks at these various levels: clearly, beginning courses emphasize "goodness of fit" of the linguistic form over meaningfulness of the message in relationship to an accepted model; intermediate and advanced students are generally expected to have mastered the basics of form, and learning activities therefore tend to deal with more complex aspects of form or with a greater emphasis on meaning over form. It would seem then that an advanced learner, in order to be successful, will have to display a much broader inventory of behavioral strategies in dealing with instructional tasks than the beginning student.

While the findings from our study allow the formulation of such a hypothesis, it is clear that it needs additional substantiation, and that further research should endeavor to quantify, through well-designed longitudinal studies, the relative weights given by students at different learning stages to the various points of the continuum described above.

The ultimate goal of research on learners' strategies is to lead to the elaboration of better conditions and better teaching and methodologies in the domain of second-language teaching and learning. The results of the present study point to two directions.

First, in order to take into account the different levels of aptitude, different learning styles, and different background variables, one should stay away from dogmatic statements of any type. For example, one should not deprive students of written material. There is ample evidence that beginners need graphic support to help them cope with aural material, and Carroll (1966, p. 105) is probably right in stating that "it is almost impossible to control the techniques that the *student himself* will adopt to acquire a given skill."[11] Furthermore, it is usually well established that "materials presented visually are more easily learned than comparable materials presented aurally" (Carroll, 1966, p. 105).

Secondly, the strategies which can be shown to be associated with high levels of achievement in a significant way must be incorporated in the teaching materials and methodologies. Since it has been established that successful learners favor a conscious and systematic approach to second-language learning, students should be presented with material organized in such a way as to allow and encourage analysis, reasoning and inferencing, and such processes should be demonstrated and illustrated in classroom activities. As pointed out by Chastain (1971, p. 144), "by his teaching and testing procedures, the teacher should demonstrate to the students that he does not expect rote learning in order to return a verbatim regurgitation of the material. In addition, he should encourage an active, questioning attitude on the part of the students, which helps them to understand and relate what is being learned to what they already know."

Since Hosenfeld's (1976) ground-breaking article, a number of studies have been undertaken which have confirmed her contention that by finding out about our students' learning strategies, "we stand to gain both individually in working with our students and in generating new insights we can all share" (p. 129). We hope that the present study has contributed to this endeavor by providing support for previous findings or intuitions and by yielding new information and suggesting new directions for further research.

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[11] It makes little sense, therefore, to insist against all odds that all printed texts be banned. The immediate effect of such a measure is generally frustration for the students who often attempt to supply their own graphic support, by writing down what they think they hear. If the banned material is available, students will use it anyhow, and because they have not received any instruction about spelling-to-sound correspondences, the results generally leave a lot to be desired. This last remark is not to be construed as providing support for the view held by proponents of the audiolingual approach, whereby printed texts hinder the acquisition of spoken material. On the contrary, it points to the necessity of dealing with written material as systematically as with the spoken language; if this is done, no harmful effect comes from the early juxtaposition of written texts and aural material.

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APPENDIX

SUMMARY OF THE PILOT STUDY OF LEARNER STRATEGIES IN THE LANGUAGE LABORATORY

During 1977/78, students in a number of language courses at the University of Alberta (viz. French 100, 200, 201, 301; German 100, 200, 201; Russian 100; Ukrainian 100; and Scandinavian 100) were asked to describe their strategies when studying in the language laboratory. A 64-item questionnaire was administered that had been obtained by abstraction of relevant content from interviews which the participating researchers had conducted with volunteer students. The questionnaire was completed by 169 students.

It was hoped (1) that students' perceptions of language laboratory study and work habits could be grouped together into meaningful patterns, (2) that other variables such as motivation and English and Mathematics marks could be associated with these patterns; (3) that achievement in the university language course could be related to these variables in a consistent manner; and, finally (4) that achievement as measured by non-standardized tests could be predicted from knowledge of laboratory learning strategies and the other variables mentioned above.

Rationale

For many years, the use of the language laboratory has been recommended by educationists, teachers and administrators, but the actual usefulness (i.e., effectiveness and efficiency) could never be shown unequivocally, usually for methodological reasons, e.g., how could one expect that "time spent in the lab" would correlate meaningfully and consistently with students' success in a course, without having given due consideration to quality and quantity of materials, the mechanical status of the equipment, its use by students and teachers; students' attentiveness, perseverance, aptitude, attitude, etc.?

The authors' intention was to isolate actual learning strategies and to determine whether the results could be meaningfully placed into the total language learning context.

Results

Because of the exploratory nature of this project, results had to remain tentative until revalidation. Yet, the size of the sample and the use of standard methods of data processing should at least guarantee applicability of results to the students at the University of Alberta, if not to students working in a language laboratory at other universities.

STEP 1: *The learning strategy patterns.*

Seven groups of strategies were factored out of the total of 64 items, i.e., seven groups which are internally united by a common principle that is realized by individual strategies.

Strategy group 1: Using printed materials prior to or concurrently with the tape ("*Reading*"): The students stated that they read along with the tape from the very first moment to connect the sound of a word with its printed form; to be able to anticipate what is going to be said and therefore to understand it better; furthermore, they could also quickly look at instructions if they happened to forget what they were supposed to do. This group of learning strategies was called, on the average, useful and frequent.

Strategy group 2: Use of writing prior to or concurrently with the tape ("*Writing*"). This group involved: writing down questions and answers so that students might have something to study from at home; writing down the model answer instead of repeating it aloud; and writing out answers to questions before recording them so that no mistakes would be made. Students felt that this pattern of lab learning strategies did not have an important place in their work habits.

Strategy group 3: Critical, comparing analysis of master and student utterance ("*Analysis*"). This group includes: comparing one's own pronunciation and grammar with that of the model while listening to a recording of the master and of one's own voice; recording the whole exercise and listening to it many times and making changes to it if necessary to learn an expression or a structure; thinking of key words around which one can build an oral response; and not being concerned with every detail at the first listening attempt, but paying special attention to it in the second or third listening attempt. The students agreed strongly with the usefulness of this set of strategies.

Strategy group 4: "*Use of context to determine meaning*". This pattern involved the following features: thinking in the foreign language while responding to cues in lab exercises; using the context, not a dictionary, to understand a difficult word; attempting to associate new words with experiences in one's own life; paying special attention to the way people use words and phrases in putting a conversation together; guessing ahead about what will come next; listening carefully to the stem of a question because we know that it contains most of the words needed to construct the answer; and wanting to know in advance what is going to be said on the tape so that one could understand and remember the message better. The students were agreed that this group of strategies represented frequent and useful ways of learning.

Strategy group 5: "*Repetition and mimicry*". Included are the following strategies: wanting to hear new words for memorization and recall and saying new phrases aloud again and again; repeating the confirming master response in a four-phrase drill because that repetition fixes the correct form better in one's mind; picking out key words when listening to conversations and repeating them. Students agreed that these strategies were useful and were frequently employed.

Strategy group 6: "*Securing meaning*". Students said that they studied carefully all new texts before listening to a recording of them so that one would understand all new constructions and vocabulary; they wrote down or made a mental note of new words and checked them out later if they got stuck on individual words while listening to new material; they identified individual elements of the message first and then put them together in their mind: they visualized the picture of a situation while doing the lab exercises, which facilitates remembering the words. Students found these strategies frequent and useful.

Strategy group 7: "*Holistic production*". Two strategies were contained in this group, viz. concentrating on fluency and quickness of response rather than on its accuracy and profundity; and concentrating totally on mimicking acoustic form when repeating; not "thinking" while doing exercises. Students were neutral or were inclined to reject these strategies.

One may generalize from these results that students tended to employ strategies of critical listening, comparing repetition

and production in the language laboratory; uncritical parroting was rejected as not useful.

Differences in the perceived effectiveness of these strategies in the various courses were observed, e.g., Beginning students in German were least likely of all groups to read along with the text; intermediate and advanced French students were neutral about the usefulness of writing with lab exercises while the other groups tended to reject it. Students in beginning Norwegian evaluated the use of context as significantly less important and frequent than did the other groups; and the advanced French course was distinguished as evaluating more positively the writing strategies, the use of context to determining meaning, and fixing meaning thoroughly before production.

STEP 2: *Motivation, previous marks in English and Mathematics and learning strategies.*

Career motivation (i.e., the expectation that knowing another foreign language would facilitate getting a better job) was positively related to more use of reading and of mimicry and repetition; to greater willingness to fix semantic content before production and to concentrate on fluency and quickness of response. Similarly, *a generalized desire to learn the other language* was positively correlated with willingness to mimic and repeat, to concentrate on fluency and quickness of response, on fixing semantic content before production, and with a greater use of context to determine meaning. Studying the foreign language for reasons of cultural interest was accompanied by a greater preparedness to use writing as a systematic learning strategy in the lab.

For the group as a whole, there was no systematic relationship between most recent marks in English and Mathematics and patterns of learning strategies.

STEP 3: *Achievement in the language course and learning strategies.*

When compared with the lower-achievement groups, students with an 8 or 9 (i.e., superior or very good students) tended to view more favorably as learning strategies (1) the use of context to determine meaning, (2) securing meaning before production; (3) the use of repetition and mimicry, and (4) use of critical analysis. On the other hand, they evaluated as less useful the reading and writing strategies, and the holistic approach to language laboratory work which emphasises quickness of response and fluency over accuracy and profundity of thought.

STEP 4: *Prediction of achievement from knowledge of students' learning strategies, English and Mathematics marks and motivation criteria.*

(1) The type of language laboratory strategy employed accounts for one quarter of the possible variation in final grades.

(2) Using all criteria mentioned above permits the explanation of *more than half of the variance*; in fact, the five best predictors (i.e., holistic approach to production, integrative motivation, a generalized desire to study the foreign language, the Mathematics mark and career motivation) supply 47% of the variance to be accounted for. These values varied greatly for the various courses (in German, for example, the variance so explained is 95%, which implies that the mark which a student received in German could be predicted with almost total accuracy from a knowledge of previous marks, his motivation and the way he studied the foreign language).

In particular, the first three predictors (Writing Strategies, Cultural Interest and Analysis) account for 26%, 23% and 8% of the variance, respectively. When English and Mathematics marks are included, the Mathematics mark, Cultural Interest and Writing Strategies together accounted for 74% in the variation of the final mark.

One would wish, of course, that for the group as a whole more than 50% of the variance could have been explained; it is clear that the prediction attempt is suffering from imprecise criterion definition: viz. the fact that the final grade is a composite of many different kinds of learning experiences for which language laboratory learning strategies may or may not have been relevant. Future research will have to obtain more uniquely defined criterion measures.

Keeping in mind the above restrictions, one may conclude:

1. that unique groups of language laboratory learning strategies do exist;
2. that they can be identified reliably;
3. that the way students learn in the language laboratory does make a difference; and
4. that marks, apparently, are influenced by study methodology.

SAMPLE OF QUESTIONNAIRE

Student ID Number: _____
Course: _____

Dear student:

This questionnaire is part of an effort to provide new insights in the area of language learning and language teaching at the University of Alberta, and we would greatly appreciate your participation in completing it. Of course, your responses will in no way affect your grades in the course you are taking.

The questionnaire deals with what learners of a second language do when they practise their lab exercises in the language lab. Our intention here is to find out whether there is a general pattern of *learning strategies*, and if so, to offer this insight to other students who are just in the process of starting to learn another language: we hope that learning might then become more effective and efficient.

For this reason, it is very important to us that you respond to the following statements as frankly as possible. Please do not bias your answers in ways which you think we would like to hear from you.

Evaluate each statement by *circling* the appropriate *Evaluation* criterion as explained below. Most of the strategies listed will apply to experiences which you are likely to have had this past year, but there may be some which do not refer to such actual experiences or activities. In that case, consider the item from the point of view of "If I had used this strategy, how important would it have been to me?" Then check the appropriate Evaluation criterion and the *Hypothetical* category.

Please comment in detail on any strategy or add others which you have found useful, but which aren't listed here.

Part I:

Legend:

1 — always; agree strongly
2 — usually; agree
3 — seldom; disagree
4 — never; disagree strongly
5 — I don't know; undecided
6 — Hypothetical

1.	During lab practice, I concentrate more on the quickness and smoothness of my response than on its accuracy.	1 2 3 4	5 6
2.	Seeing the picture of a situation or visualizing it in my mind helps me remember the spoken material associated with the situation.	1 2 3 4	5 6
3	In order to be able to remember words I must practise them in a phrase or sentence; I don't remember isolated words so well.	1 2 3 4	5 6
4.	When I respond to cues in lab exercises I first formulate the answer to myself in my native language.	1 2 3 4	5 6
5.	When I don't understand a word I use the context in which it occurs to determine its meaning.	1 2 3 4	5 6
6.	I use the dictionary while I am working in the lab.	1 2 3 4	5 6
7.	I try to be aware of which grammatical constructions give me the greatest trouble; this way I can pay special attention to them while I listen and practise.	1 2 3 4	5 6
8.	In order to learn new words, I attempt to associate them with actual situations.	1 2 3 4	5 6
9.	I study very carefully all new texts before I listen to a recording of them; I make sure that I understand the constructions and know the vocabulary.	1 2 3 4	5 6
10.	During lab practice, I concentrate more on getting the answer right than on being original.	1 2 3 4	5 6
11.	In listening to a taped conversation or to stories I take in the overall meaning without picking out key words.	1 2 3 4	5 6
12.	I pick out key words and repeat them to myself.	1 2 3 4	5 6
13.	I pick out key words and write them down.	1 2 3 4	5 6
14.	When I work in the lab I take notes.	1 2 3 4	5 6
15.	When I listen to new material in the lab, I read along in the book to connect the sounds with the printed word.	1 2 3 4	5 6
16.	During lab practice, I listen for critical features in a question because more often than not I can use them in my answers.	1 2 3 4	5 6
17.	When I listen to a spoken text in the lab I try to anticipate what will come next in an utterance.	1 2 3 4	5 6
18.	When I listen to a spoken text in the lab I identify individual elements of the message first and then I put them together in my mind.	1 2 3 4	5 6
19.	For answers to lab questions about a text I think of key words around which I can then build an oral response.	1 2 3 4	5 6
20.	In a four-phase drill (master-student-master-student) I repeat aloud the confirming master response; that second repetition fixes the correct response better in my mind.	1 2 3 4	5 6

21. When I get stuck on individual words in listening to new material I write them down and check on them later. 1 2 3 4 5 6
22. When I listen to a recording of my own voice I concentrate on comparing my pronunciation and grammar with that of the model. 1 2 3 4 5 6
23. By following along in the book I can understand the tape better. 1 2 3 4 5 6
24. When listening to a taped conversation I pay special attention to the words and phrases the people involved have selected for that particular situation. 1 2 3 4 5 6
25. When I have an oral assignment I find it helpful to record the whole exercise on tape and then to listen to it many times and to make changes and corrections as I go along. 1 2 3 4 5 6
26. I keep my book open while I practise lab exercises because that way I can look at the instructions quickly if I need to. 1 2 3 4 5 6
27. When I listen to a tape I listen to the entire paragraph or story first without being concerned with every detail right away; I pay special attention to details in a second or third listening attempt. 1 2 3 4 5 6
28. By repetition of sentences in the lab I establish a grammar pattern in my mind. 1 2 3 4 5 6
29. I try to be aware of which sounds give me the greatest trouble; this way I can pay special attention to them while I listen and practise. 1 2 3 4 5 6
30. When I do lab exercises I read the next drill item in my book before it is said on tape. 1 2 3 4 5 6
31. I concentrate on the grammar principle involved while I do grammar drills in the lab. 1 2 3 4 5 6
32. I repeat after the model and practise it many times, if necessary, to learn an expression or structure. 1 2 3 4 5 6
33. I have to have some prior knowledge of the content of a recorded passage in order to recognize the individual sentence elements. 1 2 3 4 5 6
34. When I repeat words or sentences in lab exercises I concentrate totally on mimicking their acoustic form; I don't "think" while I am doing them. 1 2 3 4 5 6
35. When I don't understand some words on a tape I check them out before I listen a second time. 1 2 3 4 5 6
36. I read along with the tape from the beginning when I do my lab exercises. 1 2 3 4 5 6
37. In order to commit new material to memory I say it aloud a number of times. 1 2 3 4 5 6
38. Before I respond orally to questions on a text I write out the answers. 1 2 3 4 5 6

Part II:

Please complete the following, but only if you have no objection.

1. Have you learned the language you are studying in this course
   a. mostly in courses:_____
   b. mostly in the home:_____
   c. mostly in the country/province where it is spoken:_____
2. Are you fluent in a third or fourth language?_____
3. Your highest mark in a high school or university English course:_____
4. Your highest mark in a high school or university Math or Science course:_____
5. Do you have a certain competence in playing a musical instrument or singing?
6. Number of years of study or a second/foreign language
   a. in school: ___ years of _____ ___ years of _____
   b. at the university: ___ years of _____ ___ years of _____
7. Do you study the foreign/second language because it is compulsory in your program? _____
8. How strong is your desire to learn the foreign/second language?
   (circle one) not very average strong very strong
9. Are you studying the foreign/second language mainly because it might help you get ahead in your career later on?
   (circle one) no yes very definitely so
10. Are you studying the foreign/second language mainly so that you can communicate with the speakers of the language, understand their thoughts and ways of behaving?
    (circle one) no yes very definitely so
11. Are you studying the foreign language mainly so that you can better enjoy the literature and the artistic and intellectual achievements of the culture in question?
    (circle one) no yes very definitely so
12. On the assumption that you took another second language course before this one (in school or at the university), were you presented with a description and explanation of a grammatical or pronunciation difficulty before or after working on it through drills in the classroom or the lab?
    (circle one) not applicable always usually seldom never

TABLE 1 -- Student Population

Course	Number of students
University of Alberta	
Second-Year French	190
Second-Year French for Teachers	15
Third-Year French	37
First-Year German	21
First-Year Japanese	14
Second-Year Japanese	12
Advanced Second-Year Japanese	7
First-Year Chinese	9
Chinese for speakers of regional dialects	10
Romance Linguistics	10
University of Victoria	
First-Year French	15
Second-Year French	17
French language and literature	36
First-Year German	20
Advanced First-Year German	9
Second-Year German	8
French Language Diploma Program: Level I	12
Level II	7
Level III	6

TABLE 2 -- Student Background Information Data

1. Have you learned the language you are studying in this course

   (a) mostly in courses: 377 students
   (b) mostly in the home: 23 students
   (c) mostly in the country/province where it is spoken: 30 students.

2. Are you fluent in a third language?

   yes: 56 students
   no: 398 students
   not given: 1 student

3. Your highest mark in a highschool or university English course[1]

   not given: 48 students
   2: 2 students
   5: 7 students
   6: 30 students
   7: 112 students
   8: 159 students
   9: 97 students
   Average: 7.74

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[1] Marks were given in or converted to nine-point grade equivalents (9 = outstanding; 8 = very good 7 = good; 6 = average; 5 = below average; 4 = poor 3 = failing; 2 = failing miserably)

4. Your highest mark in the most recent highschool or university Math or Science course

not given: 53 students
5: 8 students
6: 34 students
7: 95 students
8: 128 students
9: 137 students
Average: 7.88

5. Do you have a certain competence in playing a musical instrument or in singing?

yes: 233
no: 222

6. Number of years of study of a second/foreign language:

Years of study	a first FL in school	a second FL in school	a first FL at university	a second FL at university
none or not given	70	374	88	384
1	22	23	267	53
2	26	26	77	15
3	96	14	14	3
4	38	3	7	0
5	60	5	1	0
6	51	3	0	0
7	25	2	0	0
8	22	1	1	0
9	43	4	0	0

7. Do you study the foreign/second language because it is compulsory in your program?
yes: 46 no: 407 not given: 2

8. How strong is your desire to learn the foreign/second language?
not very: 7 students
strong: 176 students
not given: 20 students
average: 73 students
very strong: 179 students

9. Are you studying the foreign/second language mainly because it might help you get ahead in your career later on?
no: 168 students
very definitely so: 59 students
yes: 193 students
not given: 35 students

10. Are you studying the foreign/second language mainly so that you can communicate with the speakers of that language, understand their thoughts and ways of behaving?
no: 41 students
very definitely so: 94 students
yes: 289 students
not given: 31 students

11. Are you studying the foreign language mainly so that you can better enjoy the literature and the artistic and intellectual achievements of the culture in question?
no: 167 students
very definitely so: 67 students
yes: 184 students
not given: 37 students

12. On the assumption that you took another second language course before this one (in school or at the university), were you presented with a description and explanation of a grammatical or pronunciation difficulty before working on it through drills in the classroom or the lab?

Not applicable: 114 students
Always: 69 students
Usually: 144 students
Seldom: 89 students
Never: 35 students

TABLE 3 -- Number of Responses to the 38 Questionnaire Items

Learning Strategy	strong agreement (=1)	agreement (=2)	disagree (=3)	strong disagreement (=4)	undecided (=5)
1	5	121	230	73	26
2	124	206	66	27	32
3	61	176	129	55	34
4	35	106	194	103	17
5	150	251	26	10	18
6	15	35	103	293	9
7	85	240	77	18	35
8	84	206	105	26	34
9	42	140	173	64	36
10	161	215	36	7	36
11	111	167	104	25	48
12	34	148	153	51	69
13	28	84	118	153	72
14	43	81	95	126	110
15	108	129	85	84	49
16	166	218	35	11	25
17	35	176	162	57	25
18	38	225	111	30	51
19	81	246	72	11	45
20	182	170	29	19	55
21	81	153	132	76	13
22	198	176	42	14	25
23	205	133	38	22	57
24	69	221	96	20	49
25	122	156	59	37	81
26	81	127	94	78	75
27	147	228	46	6	28
28	127	241	42	12	33
29	133	242	51	10	19
30	34	93	133	105	90
31	111	240	55	13	36
32	115	239	81	5	15
33	88	174	128	44	21
34	26	84	190	123	32
35	67	172	71	42	103
36	67	124	77	102	85
37	118	236	75	13	13
38	18	76	169	163	29

TABLE 4 -- Varimax Rotated Factor Matrix: Six-Factor Solution

Learning Strategy	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
1	0.04361	-0.23077	-0.01513	0.01135	0.15331	0.12524
2	0.15439	0.02318	0.03712	0.39842	-0.02058	-0.05806
3	0.07568	0.07597	0.13122	0.13431	0.08320	-0.03297
4	0.25283	-0.15969	0.17329	-0.01378	0.00676	-0.27558
5	-0.03533	0.02423	-0.03618	0.30264	0.06127	0.25122
6	0.13459	0.00790	0.38882	-0.02057	-0.13793	0.01777
7	-0.06474	0.54052	0.13201	0.13150	0.02121	0.00340
8	-0.00831	0.12266	0.06931	0.48022	-0.04223	0.07705
9	0.08928	0.19717	0.21658	0.04895	0.02322	-0.13668
10	0.05480	0.15646	-0.07941	0.05819	0.33569	-0.07933
11	-0.11742	-0.08430	-0.14235	0.13543	0.53620	0.28947
12	0.07968	0.16127	0.09554	0.32067	-0.50393	0.05463
13	0.06103	0.02576	0.53941	0.17593	-0.23505	-0.05856
14	0.04578	0.02710	0.59260	0.00361	0.01519	-0.06972
15	0.72195	0.09305	0.10593	0.02659	-0.00520	-0.09133
16	0.06703	0.17716	-0.03174	0.37979	0.08137	0.05468
17	-0.01620	0.11066	-0.00289	0.44954	0.00938	0.18822
18	0.29995	0.06165	0.09610	0.22382	-0.08098	-0.25509
19	0.12896	0.18742	0.06632	0.43653	0.07815	-0.13134
20	-0.05225	0.22241	-0.09866	0.25147	0.20173	0.02424
21	-0.04004	0.30540	0.60110	0.10921	-0.04899	0.17631
22	0.07940	0.28580	0.02543	0.16119	0.13065	0.01082
23	0.66281	0.05120	0.01616	0.15634	0.11452	-0.15114
24	0.01783	0.29861	0.17780	0.33127	0.00226	-0.11684
25	0.12449	0.31336	0.18002	0.09158	0.14699	-0.07239
26	0.67537	0.02172	0.06121	0.09373	-0.00009	0.07141
27	0.15045	0.11322	0.02352	0.25838	0.31520	0.03597
28	-0.02628	0.47908	-0.03886	0.35729	0.08509	-0.08530
29	0.05070	0.46824	0.02794	0.10295	0.03174	0.12850
30	0.54181	-0.00082	0.19483	0.04346	-0.00985	0.42657
31	0.05408	0.49862	-0.07058	0.19450	0.00585	0.18812
32	0.04752	0.47780	0.09791	0.29397	0.06787	-0.04173
33	0.36966	-0.09834	0.07061	0.00980	-0.01817	-0.15643
34	0.18526	-0.31203	0.03387	-0.00079	0.07195	-0.02049
35	0.03762	0.31033	0.14291	0.20963	-0.15760	-0.05057
36	0.65268	0.03304	0.15632	0.05211	-0.01461	0.15909
37	0.06458	0.17003	0.13278	0.39945	-0.01579	-0.13779
38	0.23076	-0.04505	0.46355	0.00349	-0.00478	-0.04548

TABLE 5 -- Clarity of Factor Concepts as Evidenced by Average Number of "undecided" Ratings per Factor

Factor	Total Number of "undecided" ratings	Number of items	Average of undecided ratings per factor
Reading	377	6	62.83
Attention to Task Features	496	12	41.33
Writing	233	5	46.60
Using Contextual Clues	326	10	32.60
Global Approach	181	4	45.25
Cognitive Flexibility	342	9	38

TABLE 6 -- Items with Significant Differences in the Actual - Hypothetical Evaluation Dimension[1]

Learning Strategy	Mean of Actual Responses	N	Mean of Hypothetical Responses	N
3	2.83	433	3.60	5
6	3.53	435	2.82	11
9	2.70	383	1.78	36
13	3.38	437	2.61	18
15	2.44	360	1.72	46
20	1.69	377	2.04	23
21	2.48	432	1.80	10
23	1.72	340	1.52	58
26	2.52	336	1.86	44
30	2.96	311	2.22	54
35	2.27	336	1.81	16
36	2.69	310	1.98	60

[1] The two N's do not necessarily add up to 455 because of the "undecided" responses.